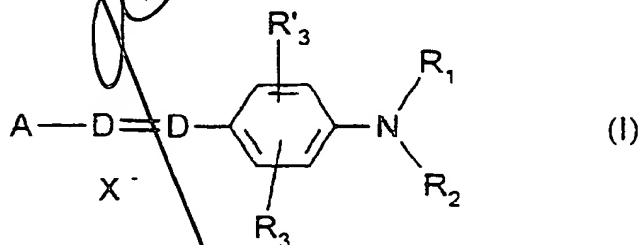


CLAIMS

1. Composition for dyeing keratinous fibres and in particular human keratinous fibres such as hair, containing in an appropriate dyeing medium, (i) at least compound chosen from those of the following formulae (I), (II), (III), (III'), (IV):

a) the compounds of the following formula

(I):



10 in which:

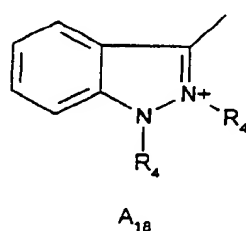
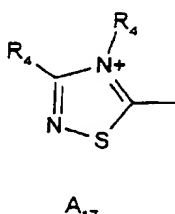
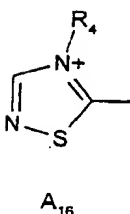
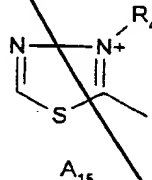
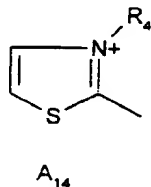
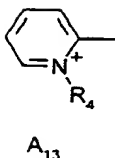
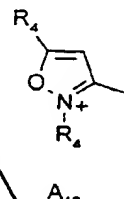
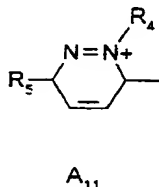
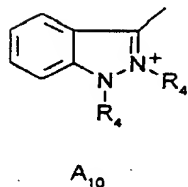
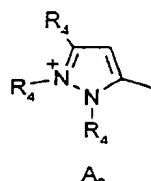
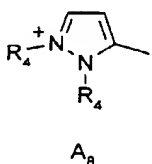
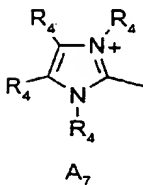
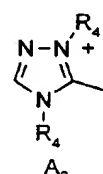
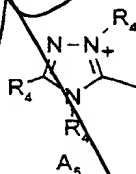
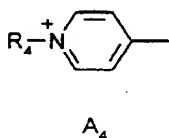
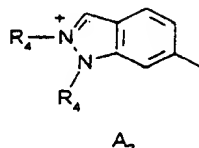
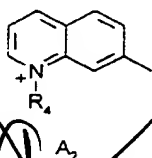
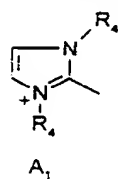
D represents a nitrogen atom or the $-CH$ group,

R_1 and R_2 , which are identical or different, represent a hydrogen atom; a C_1 - C_4 alkyl radical which may be substituted with a $-CN$, $-OH$ or $-NH_2$ radical or form with a carbon atom of the benzene ring an optionally oxygen-containing or nitrogen-containing heterocycle which may be substituted with one or more C_1 - C_4 alkyl radicals; a 4'-aminophenyl radical,

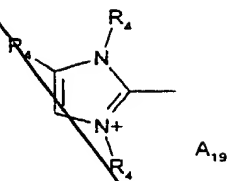
20 R_3 and R'_3 , which are identical or different, represent a hydrogen or halogen atom chosen from chlorine, bromine, iodine and fluorine, a cyano, C_1 - C_4 alkyl, C_1 - C_4 alkoxy or acetyloxy radical,

X^- represents an anion which is preferably chosen from chloride, methylsulphate and acetate,

A represents a group chosen from the following structures A_1 to A_{19} :



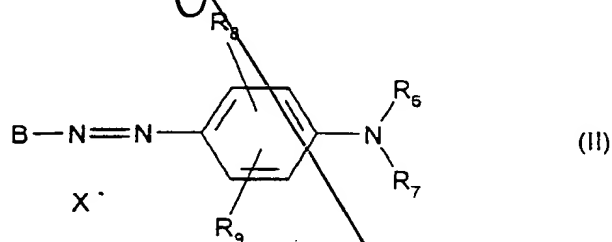
and



in which R_4 represents a C_1 - C_4 alkyl radical which may be substituted with a hydroxyl radical and R_5 represents
 5 a C_1 - C_4 alkoxy radical, with the proviso that when D represents $-CH$, A represents A_4 or A_{13} and R_3 is different from an alkoxy radical, then R_1 and R_2 do not simultaneously denote a hydrogen atom;

b) the compounds of the following formula

10 (II) :



in which:

R_6 represents a hydrogen atom or a C_1 - C_4 alkyl radical,

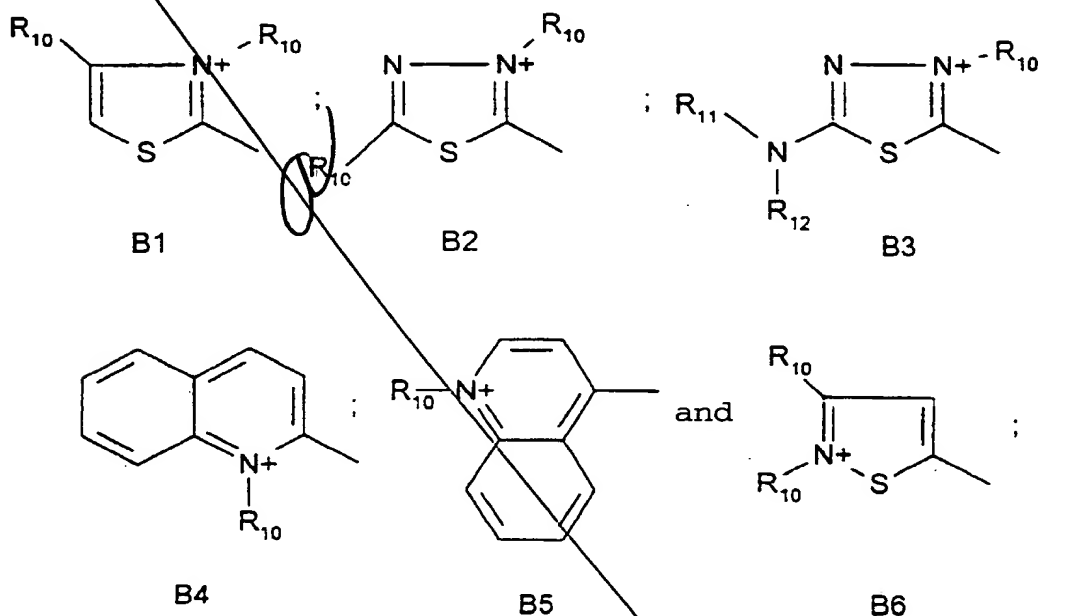
15 R_7 represents a hydrogen atom, an alkyl radical which may be substituted with a $-CN$ radical or with an amino group, a 4'-aminophenyl radical or forms with R_6 an optionally oxygen-containing and/or nitrogen-containing heterocycle which may be substituted with a
 20 C_1 - C_4 alkyl radical,

R_8 and R_9 , which are identical or different, represent a hydrogen atom, a halogen atom such as

bromine, chlorine, iodine or fluorine, a C₁-C₄ alkyl or C₁-C₄ alkoxy radical, a -CN radical,

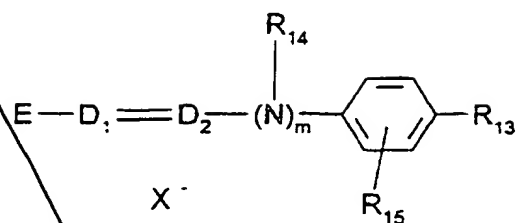
X⁻ represents an anion which is preferably chosen from chloride, methylsulphate and acetate,

5 B represents a group chosen from the following structures B1 to B6:

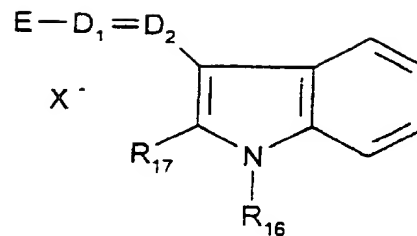


in which R₁₀ represents a C₁-C₄ alkyl radical, R₁₁ and R₁₂, which are identical or different, represent a
10 hydrogen atom or a C₁-C₄ alkyl radical;

c) the compounds of the following formulae (III) and (III'):



(III)



(III')

in which:

R_{13} represents a hydrogen atom, a $\text{C}_1\text{-C}_4$ alkoxy radical, a halogen atom such as bromine, chlorine, iodine or fluorine or an amino radical,

R_{14} represents a hydrogen atom, a $\text{C}_1\text{-C}_4$ alkyl radical or forms with a carbon atom of the benzene ring a heterocycle which is optionally oxygen-containing and/or substituted with one or more $\text{C}_1\text{-C}_4$ alkyl groups,

R_{15} represents a hydrogen or halogen atom such as bromine, chlorine, iodine or fluorine,

R_{16} and R_{17} , which are identical or different, represent a hydrogen atom or a $\text{C}_1\text{-C}_4$ alkyl radical,

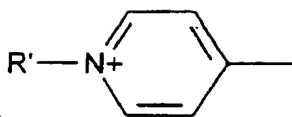
D_1 and D_2 , which are identical or different, represent a nitrogen atom or the $-\text{CH}$ group,

$m = 0$ or 1 ,

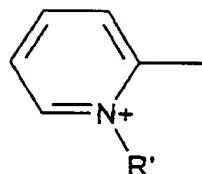
it being understood that when R_{13} represents an unsubstituted amino group, then D_1 and D_2 simultaneously represent a $-\text{CH}$ group and $m = 0$,

X^- represents an anion which is preferably chosen from chloride, methylsulphate and acetate,

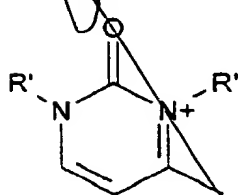
E represents a group chosen from the following structures E1 to E8:



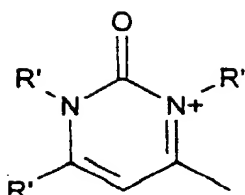
E1



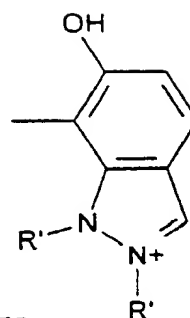
E2



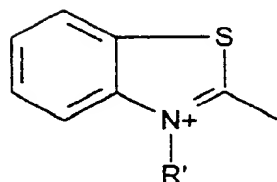
E3



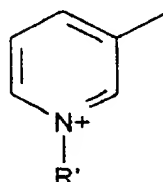
E4



E5

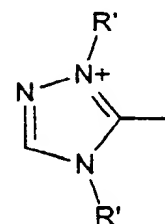


E6



E7

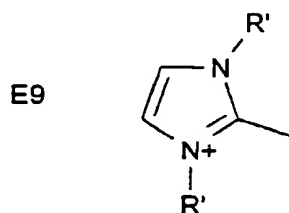
and



E8

in which R' represents a C₁-C₄ alkyl radical;

5 when m = 0 and D₁ represents a nitrogen atom,
then E may also denote a group having the following
structure E9:



E9

10 in which R' represents a C₁-C₄ alkyl radical,

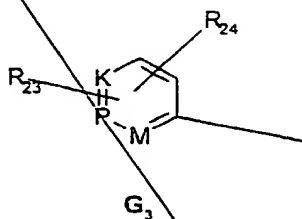
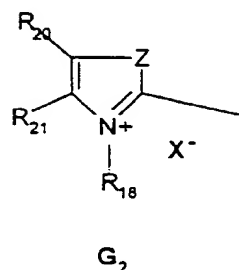
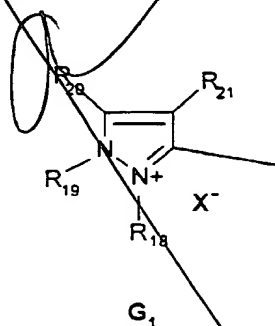
d) the compounds of the following formula

(IV):



in which:

- 5 the symbol G represents a group chosen from the following structures G₁ to G₃:



in which structures G₁ to G₃,

- 10 R₁₈ denotes a C₁-C₄ alkyl radical, a phenyl radical which may be substituted with a C₁-C₄ alkyl radical or a halogen atom chosen from chlorine, bromine, iodine and fluorine;

R₁₉ denotes a C₁-C₄ alkyl radical or a phenyl radical;

- 15 R₂₀ and R₂₁, which are identical or different, represent a C₁-C₄ alkyl radical, a phenyl radical, or form together in G₁ a benzene ring which is substituted with one or more C₁-C₄ alkyl, C₁-C₄ alkoxy or NO₂ radicals, or form together in G₂ a benzene ring which is optionally

substituted with one or more C₁-C₄ alkyl, C₁-C₄ alkoxy or NO₂ radicals;

R₂₀ may denote, in addition, a hydrogen atom;

Z denotes an oxygen or sulphur atom or an -NR₁₉ group;

5 M represents a group -CH, -CR (R denoting C₁-C₄ alkyl), or -NR₂₂(X⁻)_r;

K represents a group -CH, -CR (R denoting C₁-C₄ alkyl), or -NR₂₂(X⁻)_r;

10 P represents a group -CH, -CR (R denoting C₁-C₄ alkyl), or -NR₂₂(X⁻)_r; r denotes zero or 1;

R₂₂ represents an O⁻ atom, a C₁-C₄ alkoxy radical or a C₁-C₄ alkyl radical;

15 R₂₃ and R₂₄, which are identical or different, represent a hydrogen or halogen atom chosen from chlorine, bromine, iodine and fluorine, a C₁-C₄ alkyl radical, a C₁-C₄ alkoxy radical or an -NO₂ radical;

X⁻ represents an anion which is preferably chosen from chloride, iodide, methylsulphate, ethylsulphate, acetate and perchlorate;

20 with the proviso that

if R₂₂ denotes O⁻, then r denotes zero;

if K or P or M denote -N-(C₁-C₄ alkyl)X⁻, then R₂₃ or R₂₄ is different from a hydrogen atom;

if K denotes -NR₂₂(X⁻)_r, then M = P = -CH, -CR;

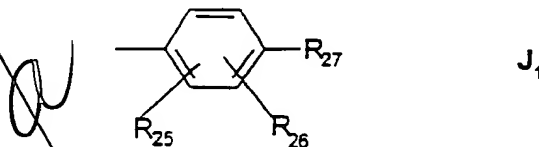
25 if M denotes -NR₂₂(X⁻)_r, then K = P = -CH, -CR;

if P denotes -NR₂₂(X⁻)_r, then K = M and denote -CH or -CR;

if Z denotes a sulphur atom with R_{21} denoting C_1-C_4 alkyl, then R_{20} is different from a hydrogen atom;
 if Z denotes $-NR_{22}$ with R_{19} denoting C_1-C_4 alkyl, then at least one of the R_{18} , R_{20} or R_{21} radicals of G_2 is
 5 different from a C_1-C_4 alkyl radical;

the symbol J represents:

-(a) a group having the following structure J_1 :



10 in which structure J_1 ,

R_{25} represents a hydrogen atom, a halogen atom chosen from chlorine, bromine, iodine and fluorine, a C_1-C_4 alkyl radical, a C_1-C_4 alkoxy radical, a radical $-OH$, $-NO_2$, $-NHR_{28}$, $-NR_{29}R_{30}$, $-NHCO(C_1-C_4\text{alkyl})$, or forms with

15 R_{26} a 5- or 6-membered ring containing or otherwise one or more heteroatoms chosen from nitrogen, oxygen or sulphur;

R_{26} represents a hydrogen atom, a halogen atom chosen from chlorine, bromine, iodine and fluorine, a C_1-C_4

20 alkyl or C_1-C_4 alkoxy radical, or forms with R_{27} or R_{28} a 5- or 6-membered ring containing or otherwise one or more heteroatoms chosen from nitrogen, oxygen or sulphur;

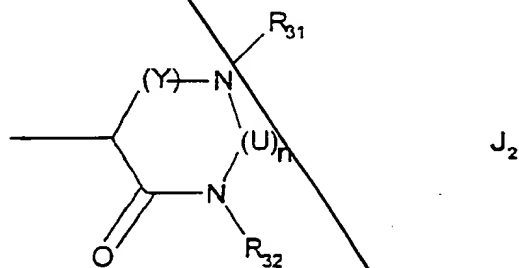
R_{27} represents a hydrogen atom, an $-OH$ radical, an $-NHR_{28}$
 25 radical, an $-NR_{29}R_{30}$ radical;

R_{28} represents a hydrogen atom, a C_1-C_4 alkyl radical, a

C₁-C₄ monohydroxyalkyl radical, a C₂-C₄ polyhydroxyalkyl radical, a phenyl radical;

R₂₉ and R₃₀, which are identical or different, represent a C₁-C₄ alkyl radical, a C₁-C₄ monohydroxyalkyl radical,
5 a C₂-C₄ polyhydroxyalkyl radical;

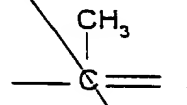
(b) a 5- or 6- membered nitrogen-containing heterocycle group which is capable of containing other heteroatoms and/or carbonyl-containing groups and which may be substituted with one or more C₁-C₄ alkyl, amino
10 or phenyl radicals,
and in particular a group having the following structure J₂:



15 in which structure J₂,

R₃₁ and R₃₂, which are identical or different, represent a hydrogen atom, a C₁-C₄ alkyl radical, a phenyl radical;

Y denotes the -CO- radical or the radical

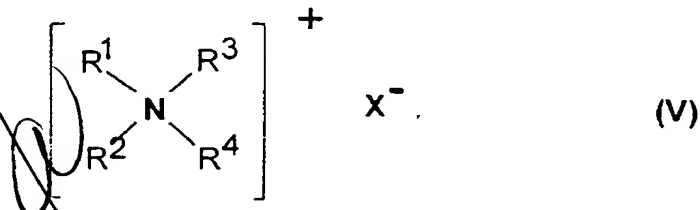


20 n = 0 or 1, with, when n denotes 1, U denotes the -CO- radical.

the said composition being characterized in that it contains, in addition,

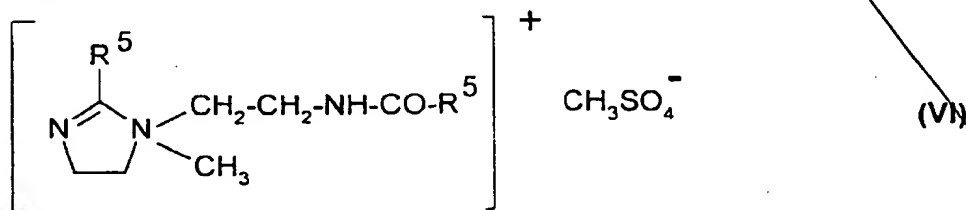
(ii) at least one quaternary ammonium salt chosen from the group comprising:

(ii)₁ - those of the following formula (V):



5 in which,
the radicals R^1 to R^4 , which are identical or different, denote a saturated or unsaturated, linear or branched, aliphatic hydrocarbon radical comprising from 1 to ~~about~~ 30 carbon atoms, or an
10 alkoxy, alkoxycarbonylalkyl, polyoxyalkylene, alkylamido, alkylamidoalkyl, hydroxyalkyl, aromatic, aryl or alkylaryl radical comprising from 12 to about 30 carbon atoms, with at least one radical among R^1 , R^2 , R^3 and R^4 denoting a
15 radical comprising from 8 to 30 carbon atoms;
 X^- is an anion chosen from the group ~~comprising~~ ^{consisting of} halides, phosphates, acetates, lactates and alkyl sulphates;

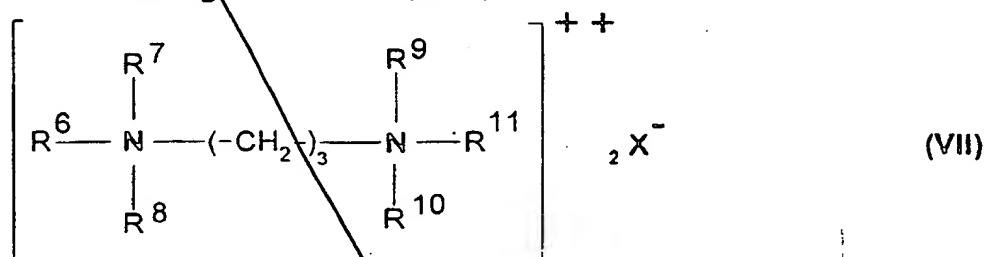
20 (ii)₂ - the imidazolium salts of the following formula (VI):



in which,

R^5 is chosen from the alkenyl and/or alkyl radicals comprising from 13 to 31 carbon atoms and derived from tallow fatty acids.

(ii)₃ - the quaternary diammonium salts of the following formula (VII):

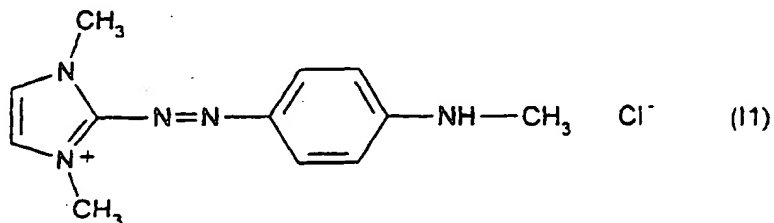


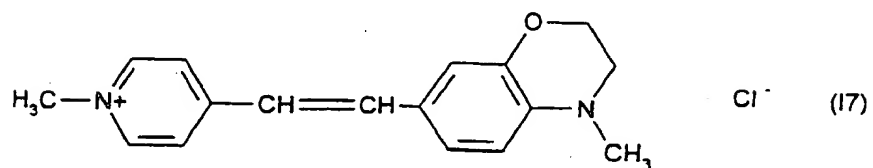
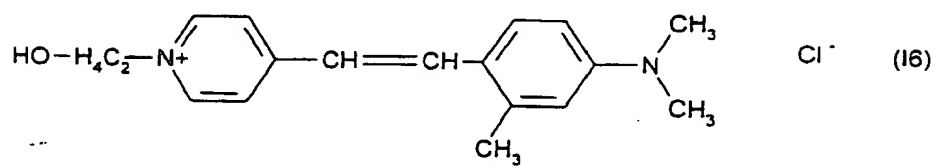
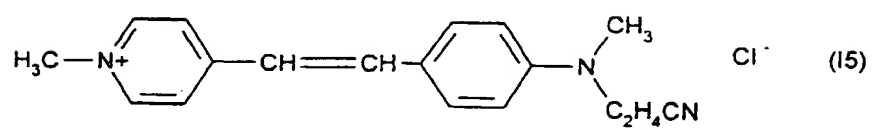
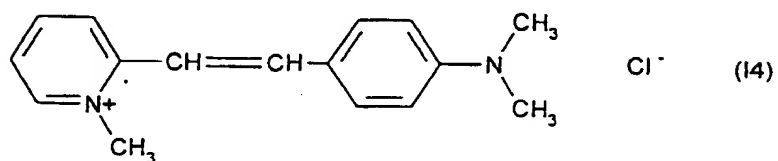
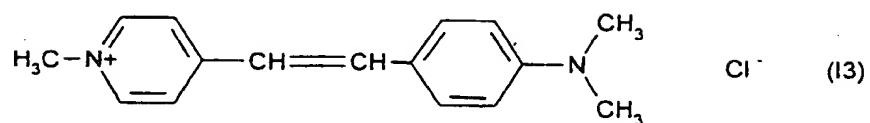
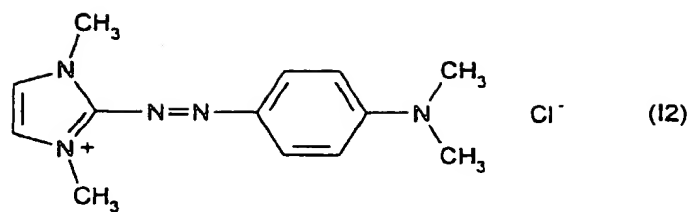
in which,

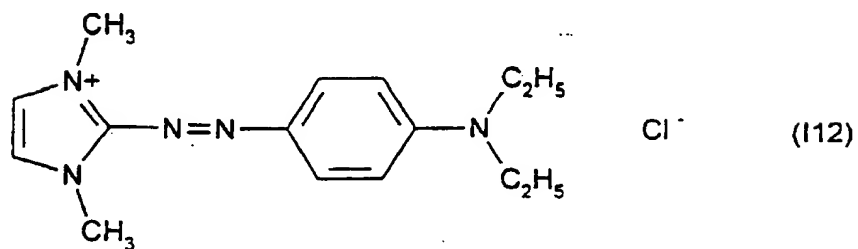
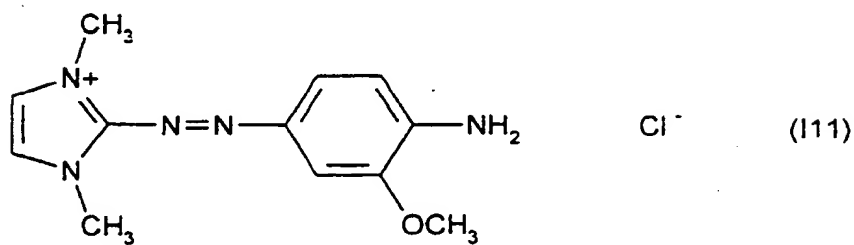
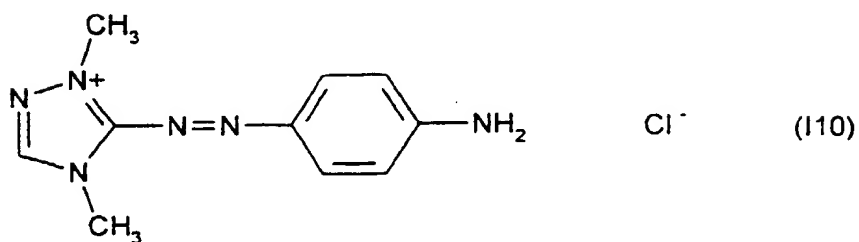
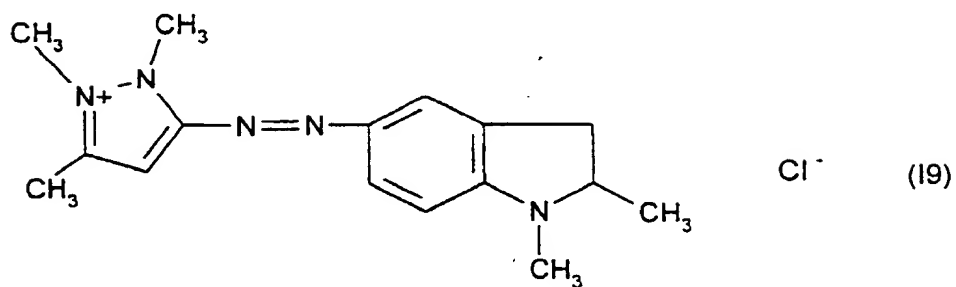
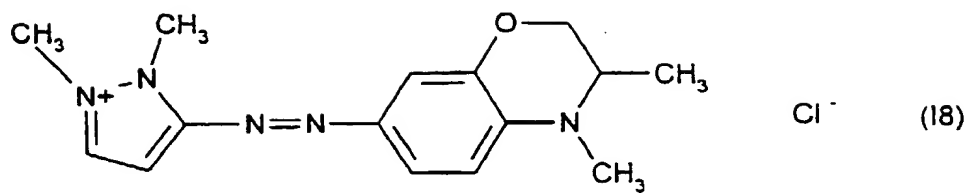
R^6 denotes an aliphatic radical comprising from 16 to 30 carbon atoms, R^7 , R^8 , R^9 , R^{10} and R^{11} are chosen from hydrogen or an alkyl radical comprising from 1 to 4 carbon atoms, and X^- is an anion chosen from the group comprising halides, acetates, phosphates and sulphates.

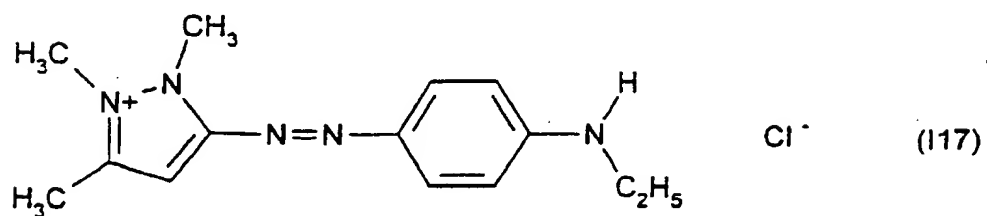
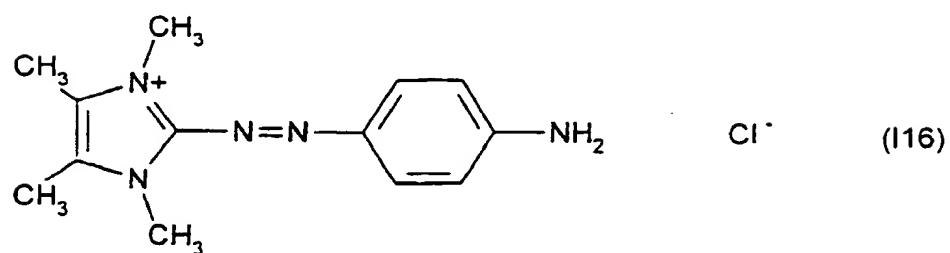
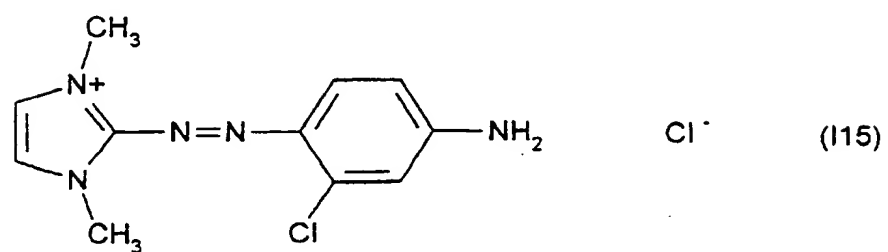
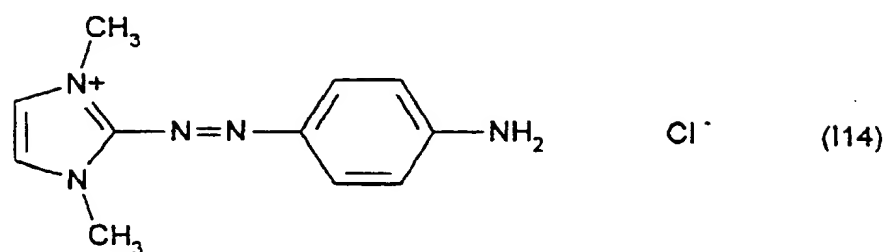
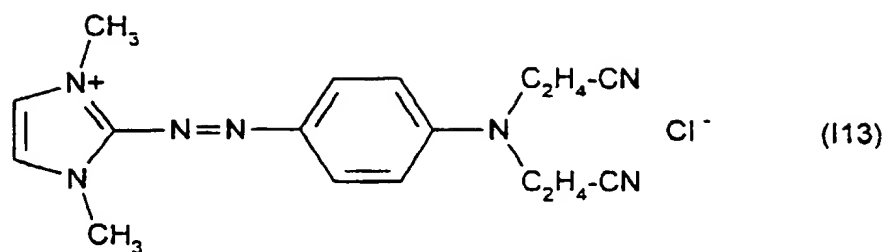
2. ~~Composition according to Claim 1,~~

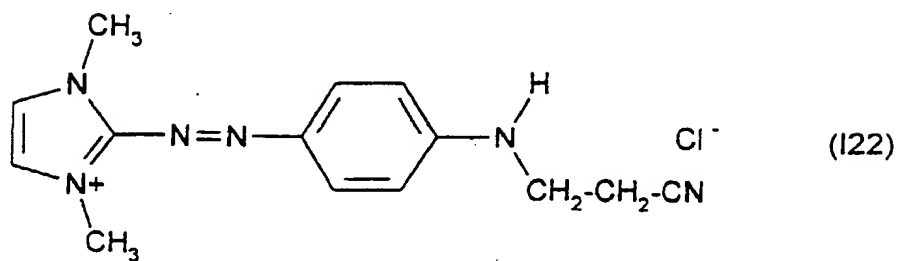
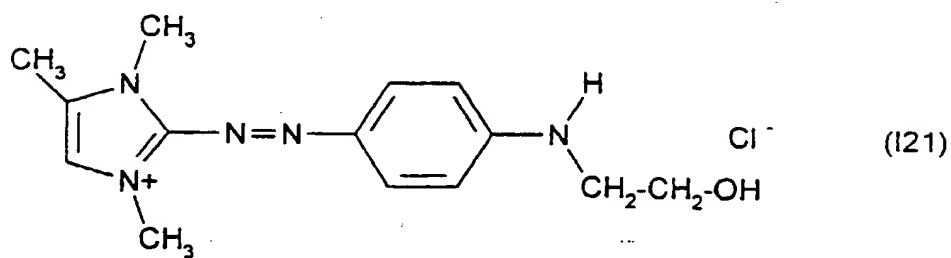
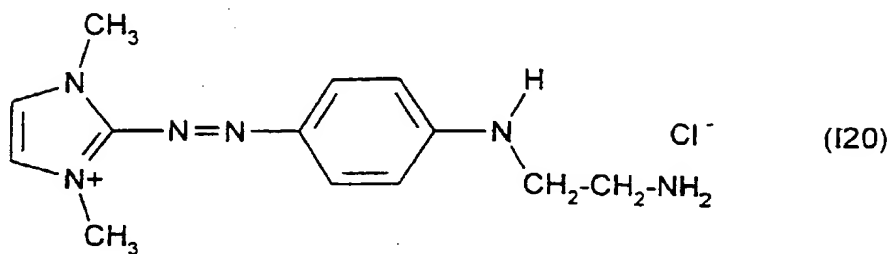
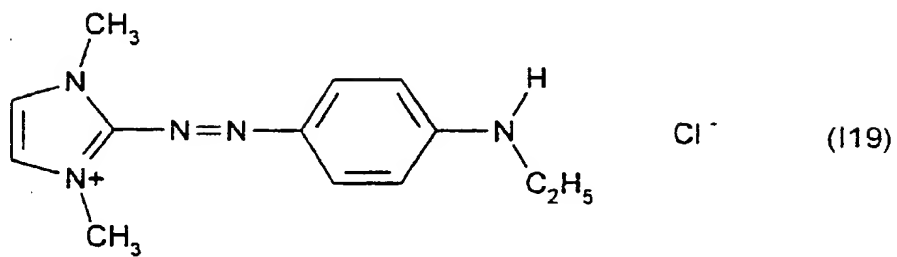
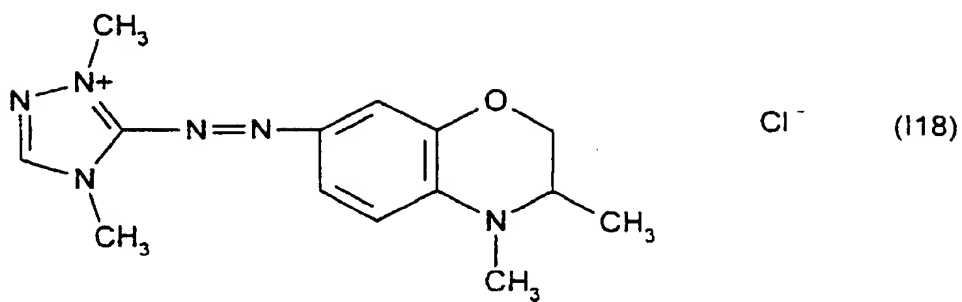
~~characterized in that~~ the cationic direct dyes of formula (I) are chosen from the compounds corresponding to the following structures (I1) to (I54):

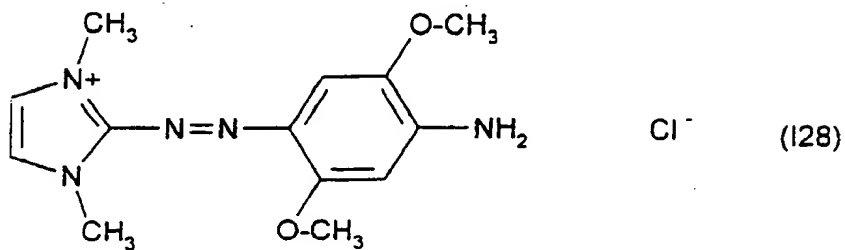
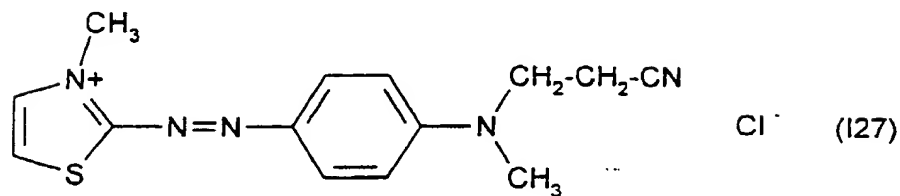
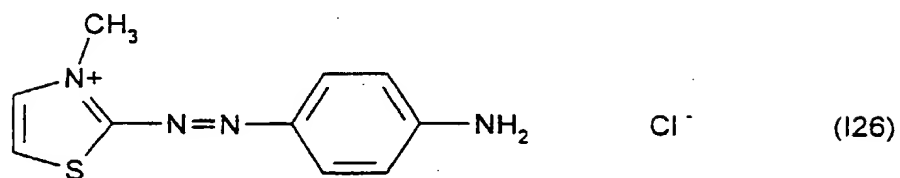
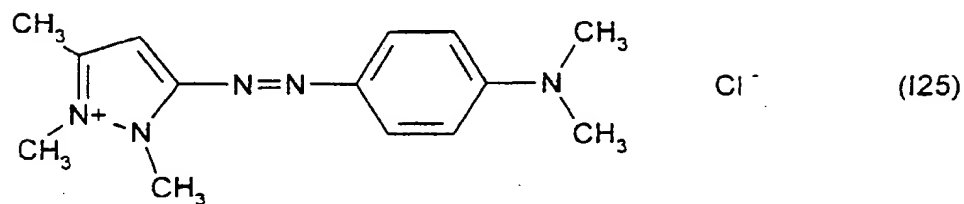
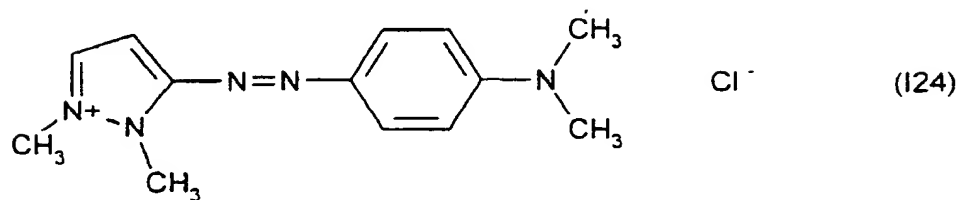
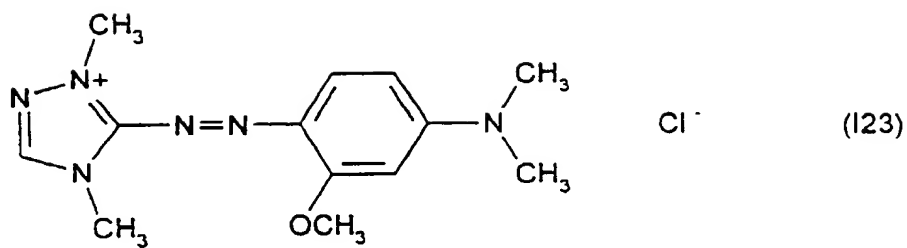


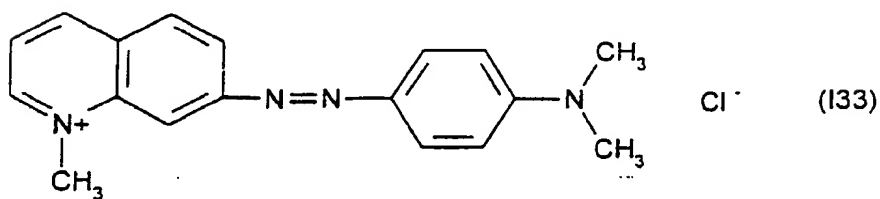
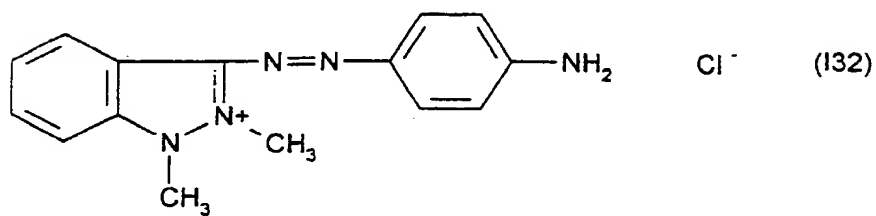
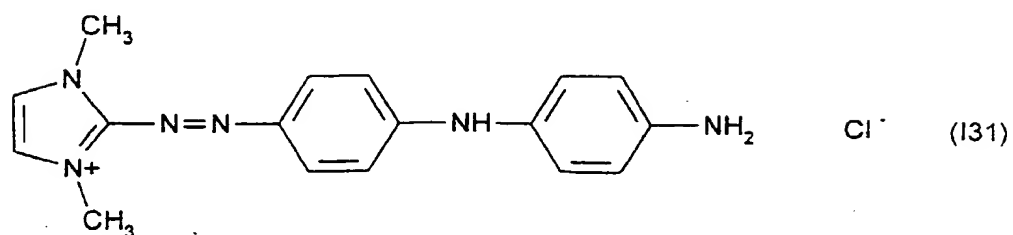
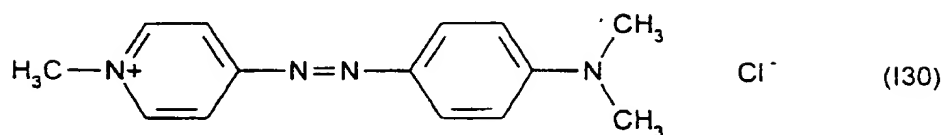
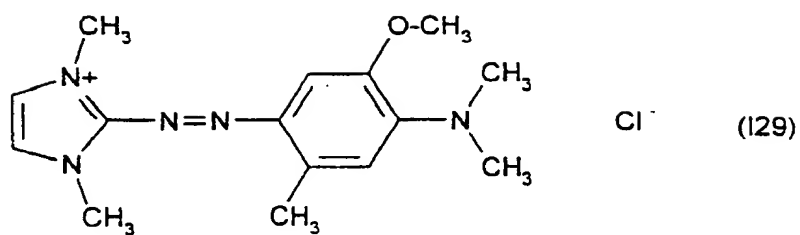


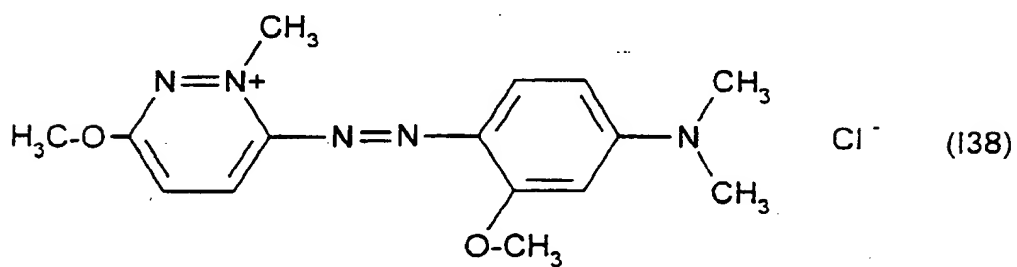
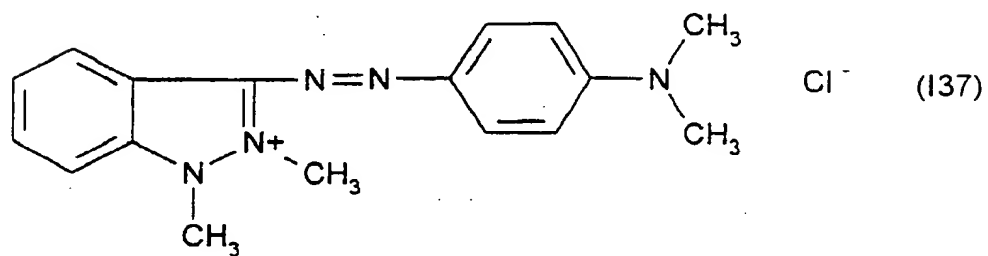
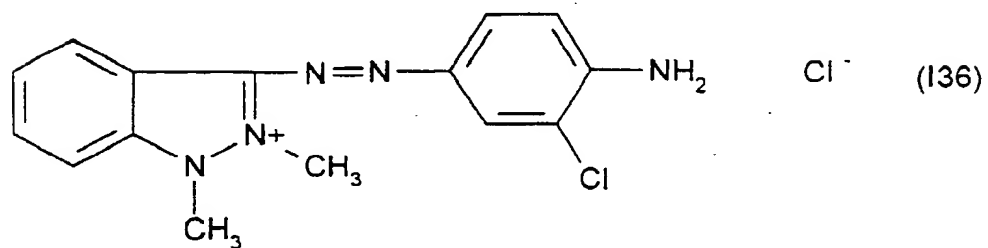
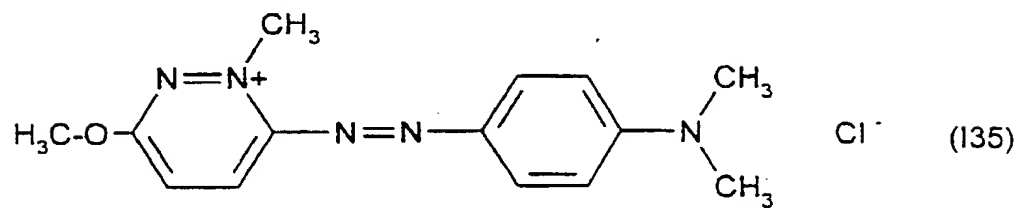
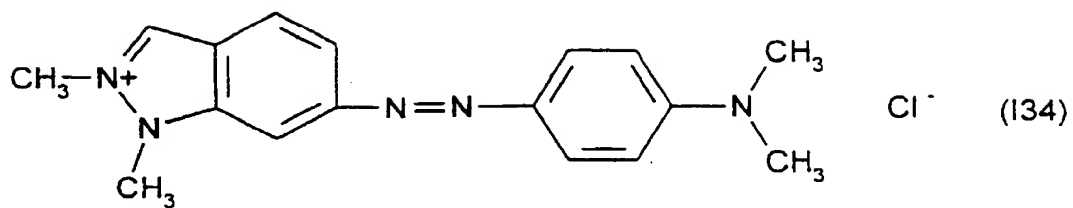


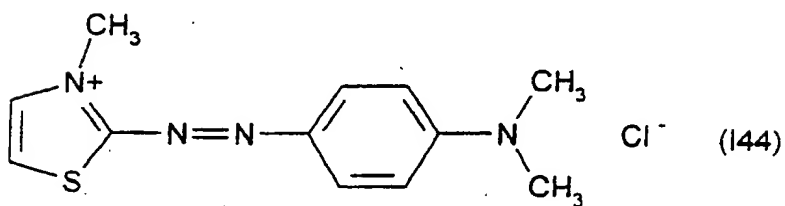
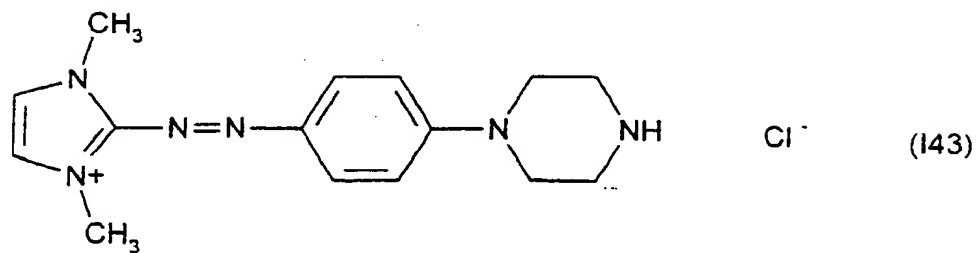
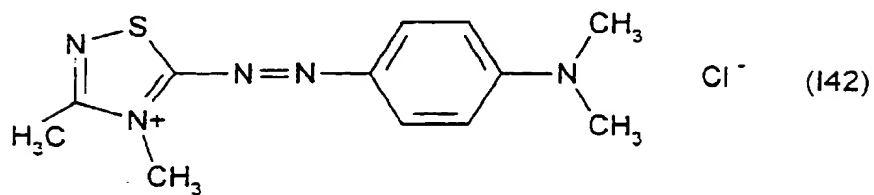
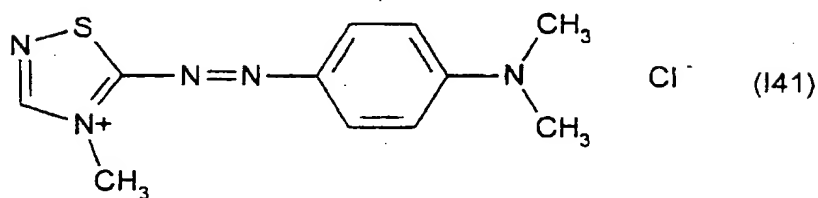
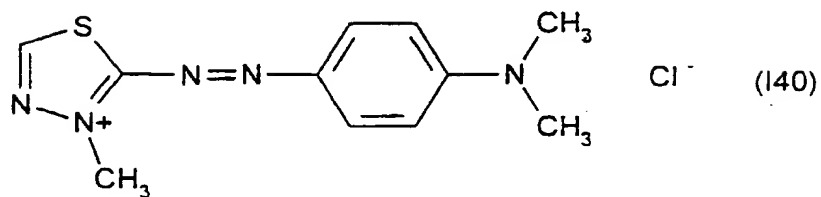
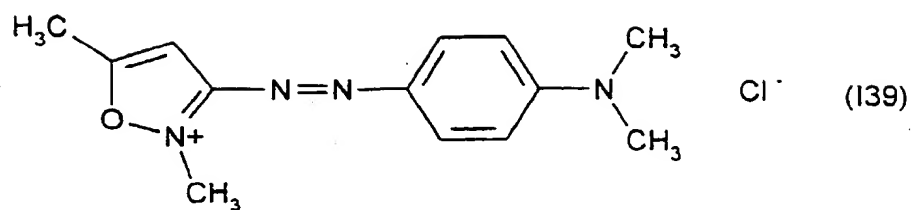


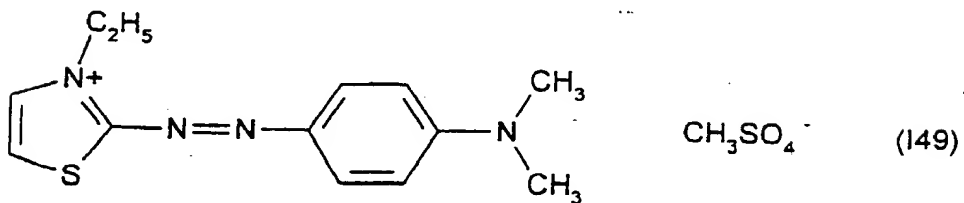
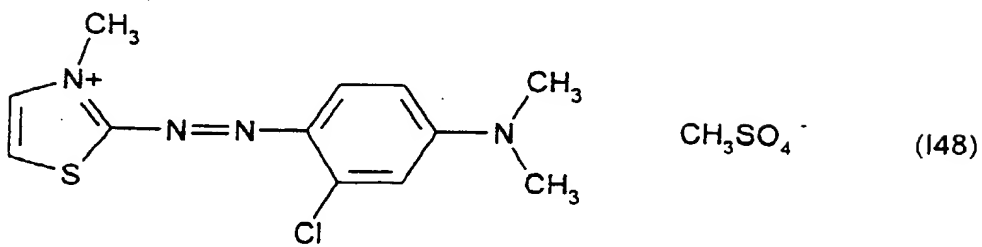
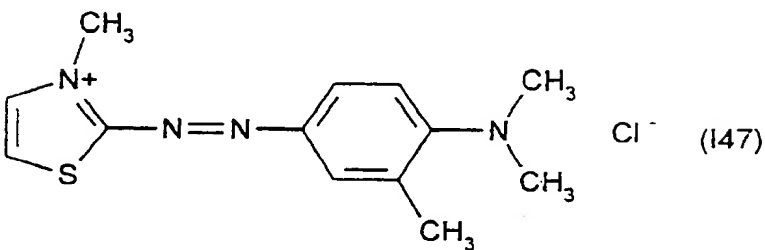
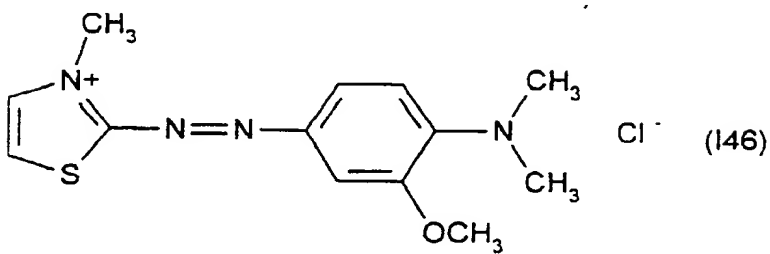
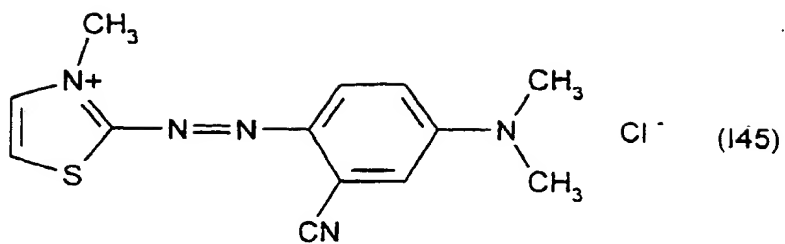


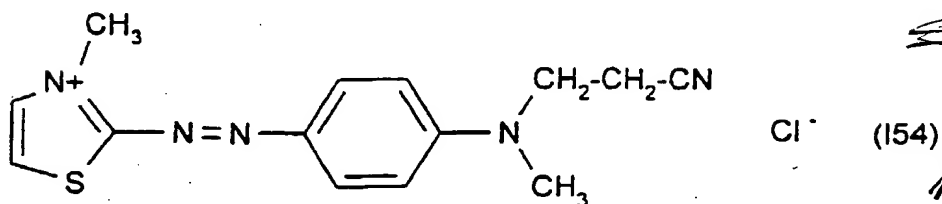
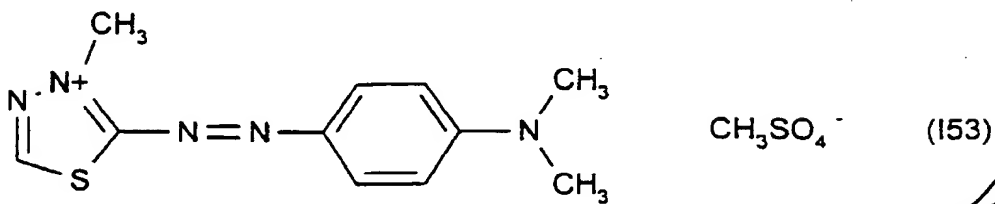
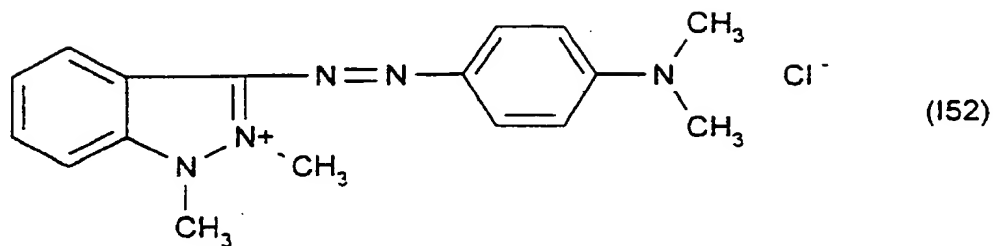
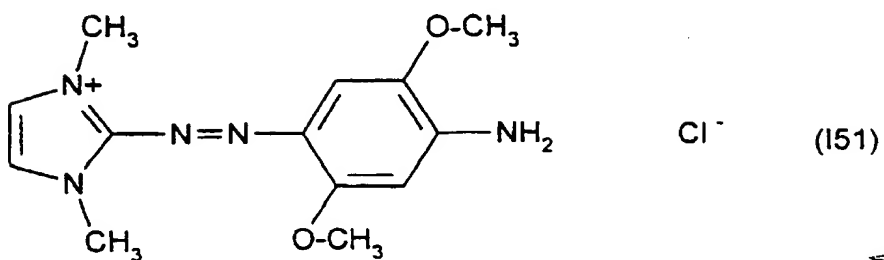
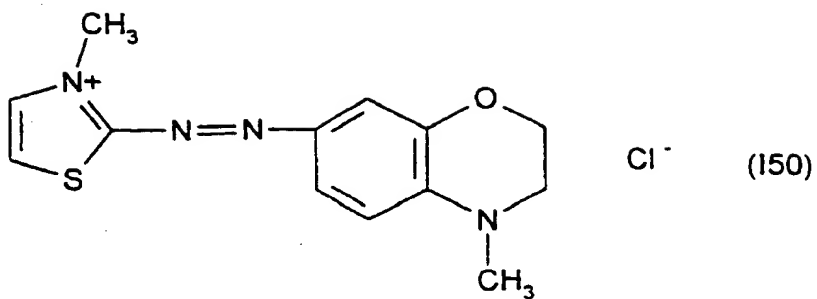












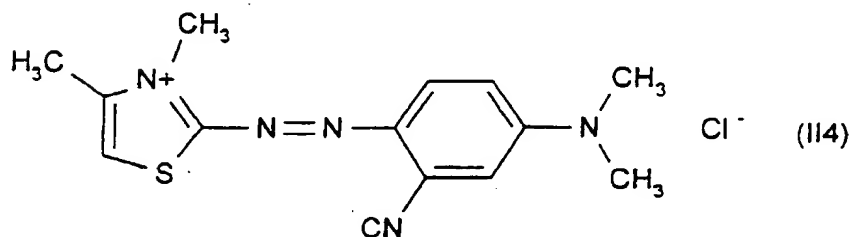
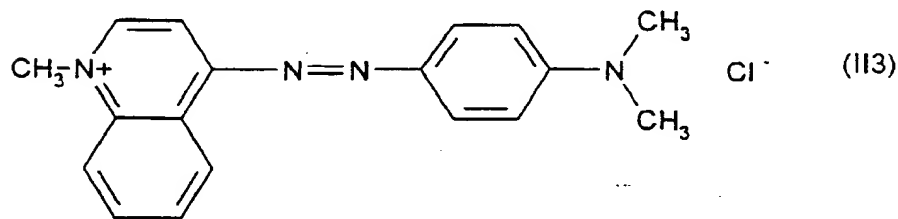
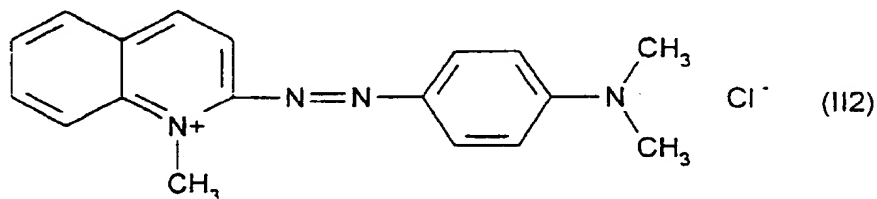
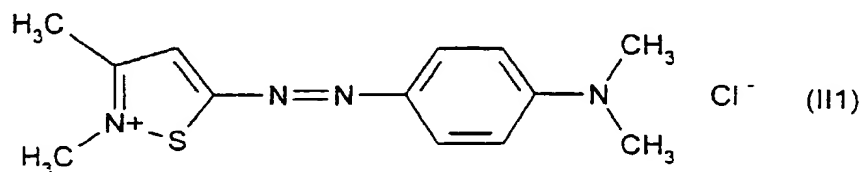
3. Composition according to Claim 2,

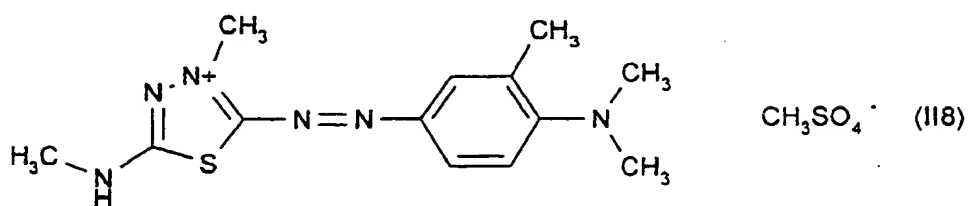
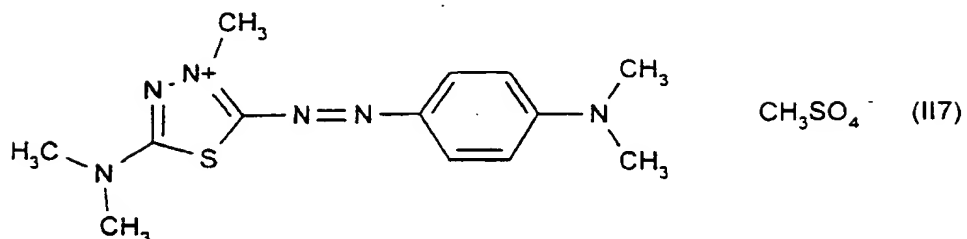
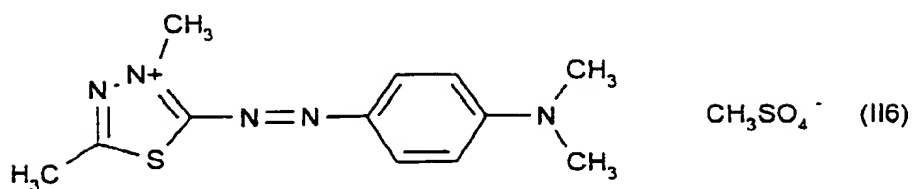
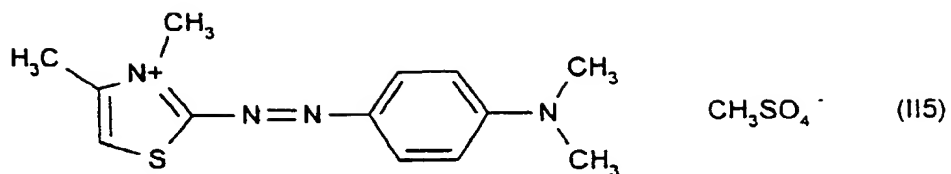
characterized in that the cationic direct dyes correspond to the structures (I1), (I2), (I14), and (I31).

5

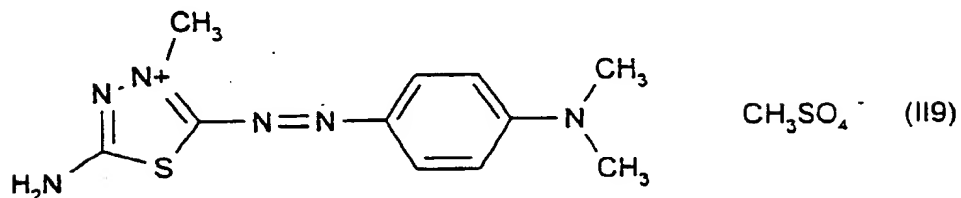
4. ~~Composition according to Claim 1,~~

~~characterized in that the cationic direct dyes of formula (II) are chosen from the compounds corresponding to the following structures (II1) to (II9):~~





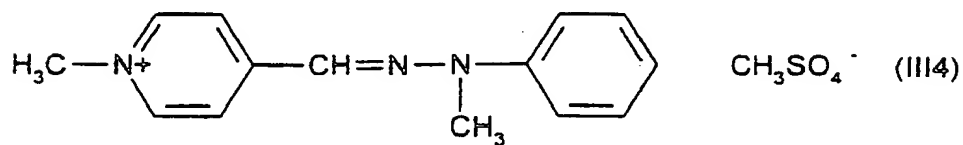
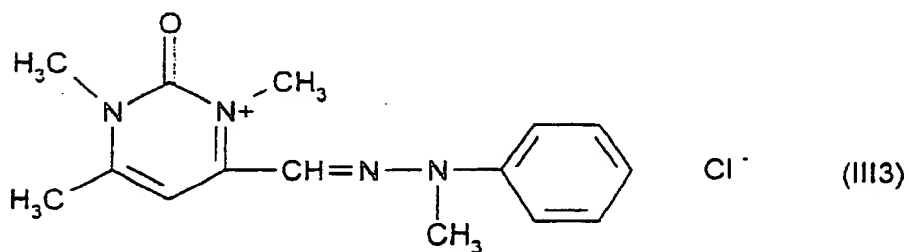
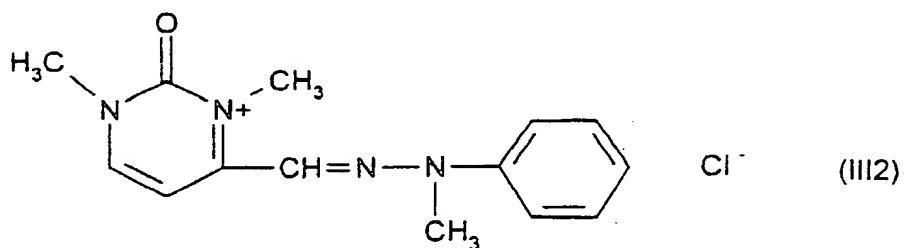
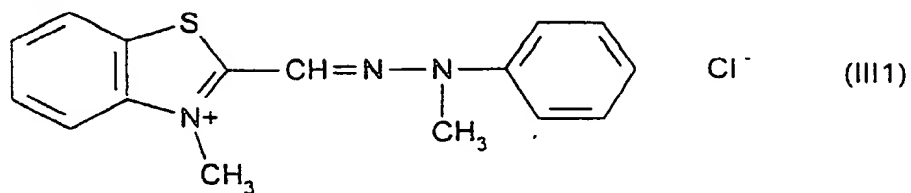
; and

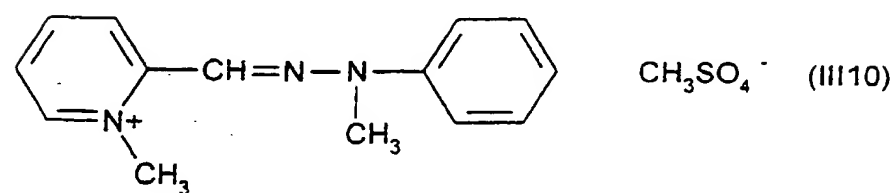
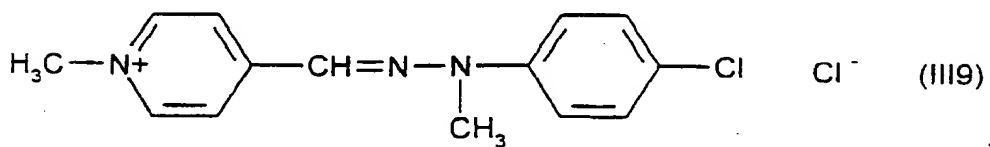
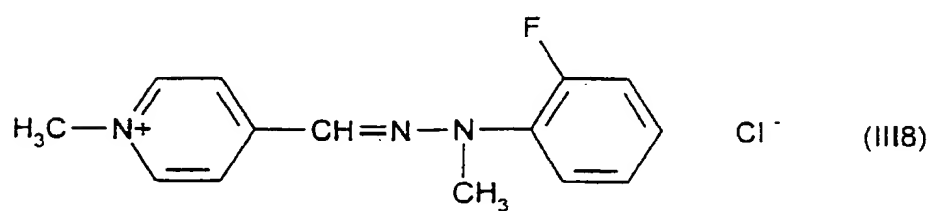
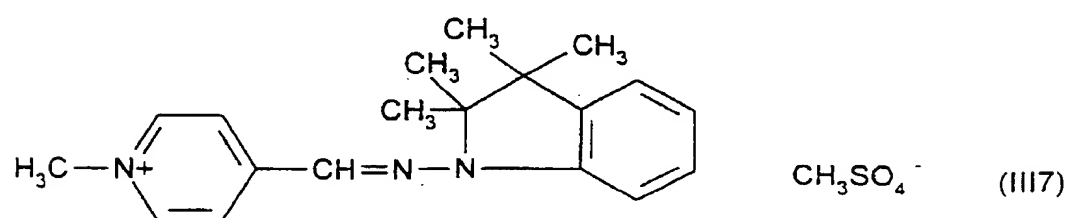
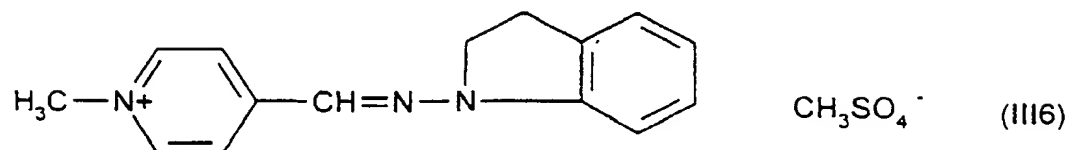
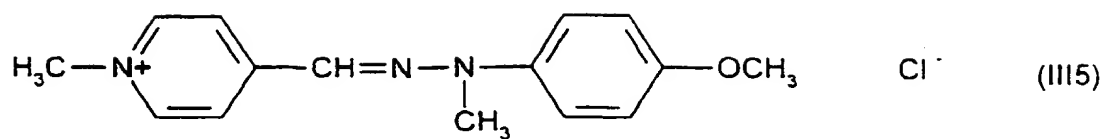


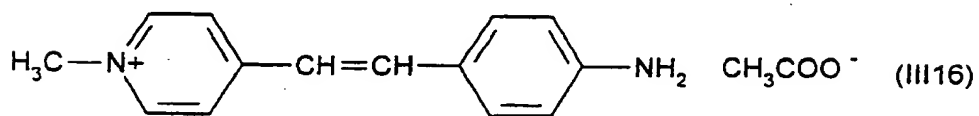
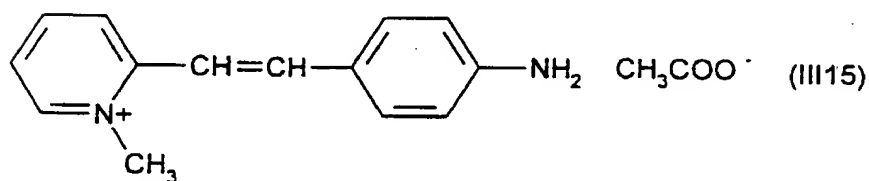
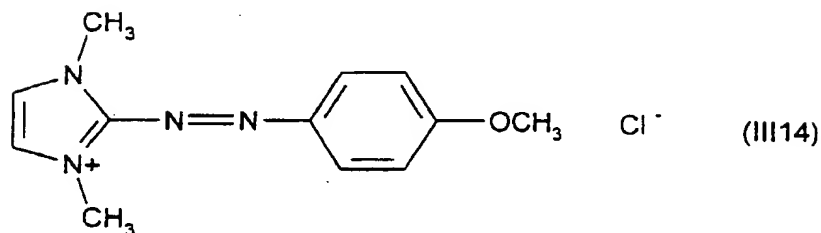
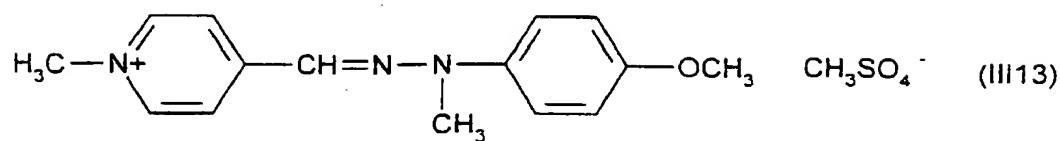
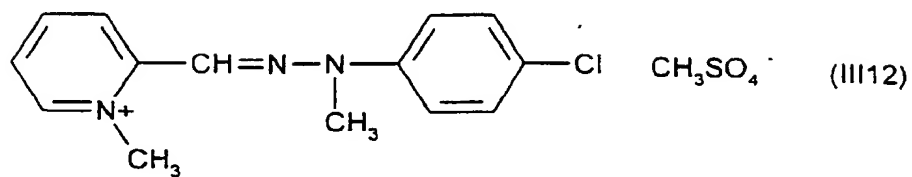
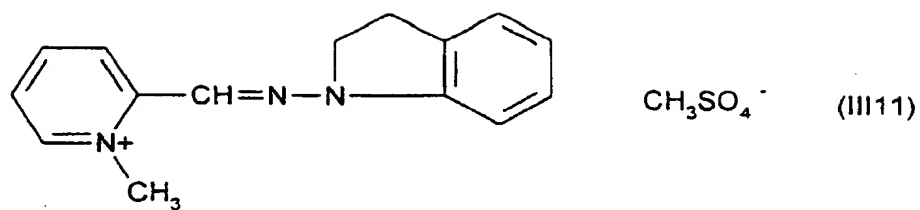
5. ~~Composition according to Claim 1,~~
 5 ~~characterized in that~~ the cationic direct dyes of

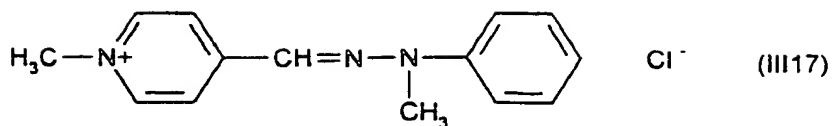
15

formula (III) are chosen from the compounds corresponding to the following structures (III1) to (III18) :

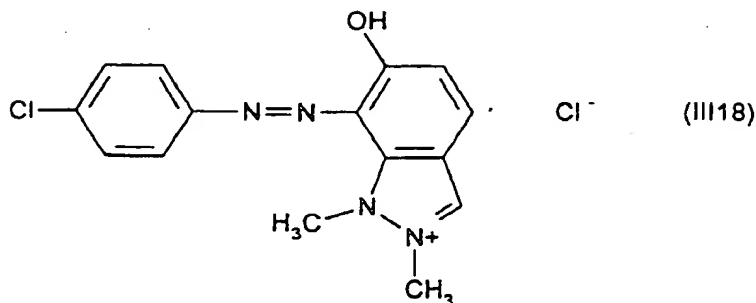








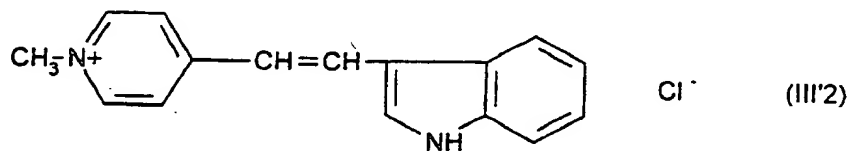
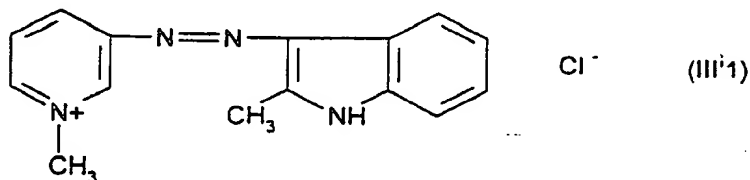
; and



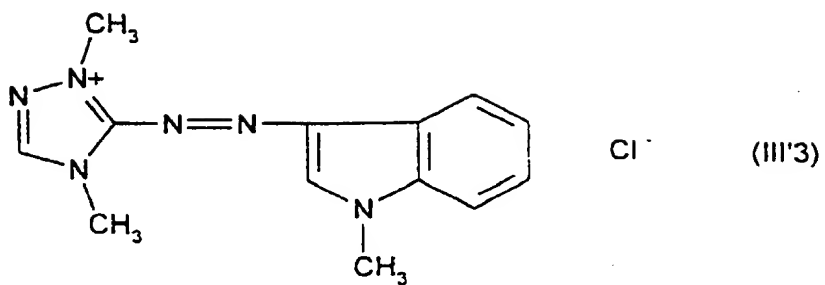
6. Composition according to Claim 5,
characterized in that the cationic direct dyes of
formula (III) are chosen from the compounds
corresponding to the structures (III4), (III5) and
(III13).

~~7. Composition according to Claim 1,
characterized in that the cationic direct dyes of~~
formula (III') are chosen from the compounds

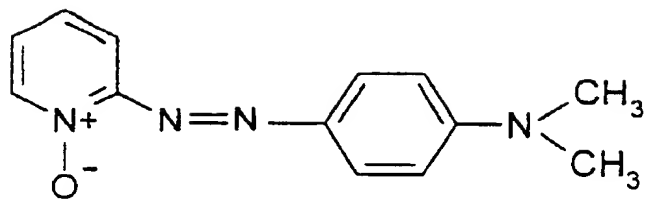
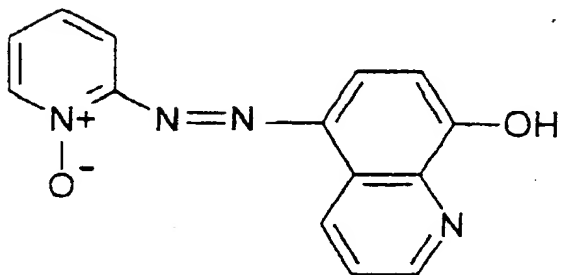
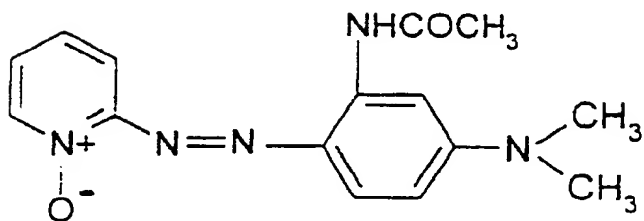
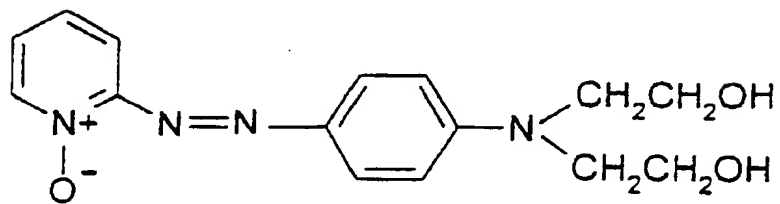
10 corresponding to the following structures (III'1) to
(III'3):

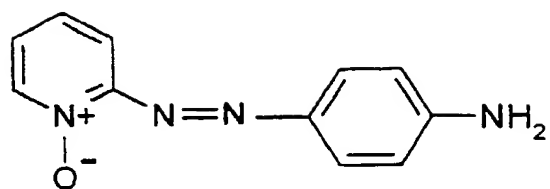
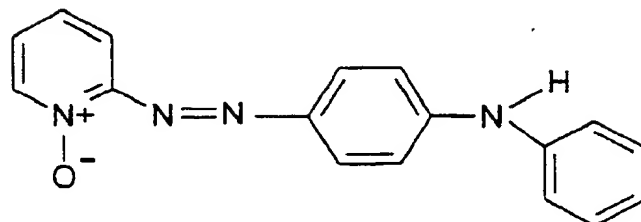
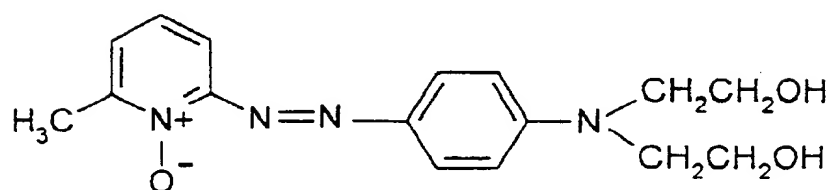
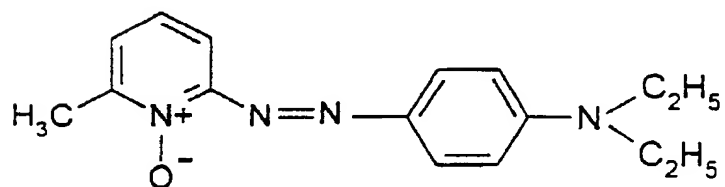
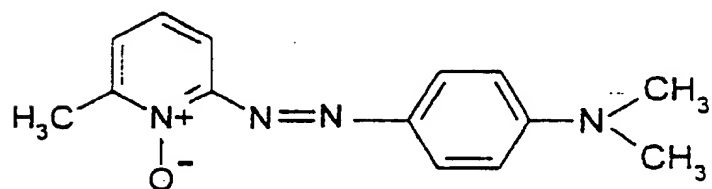
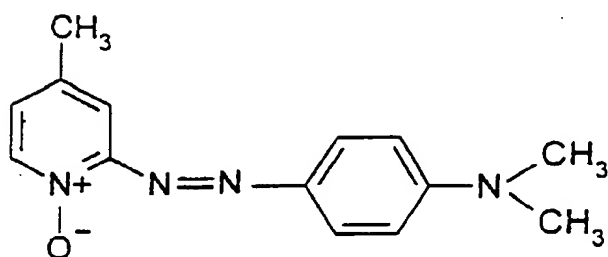


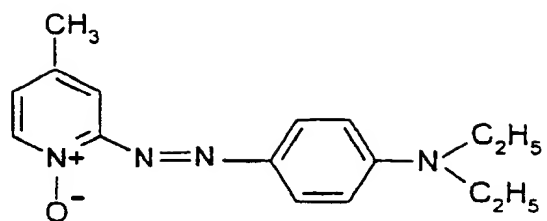
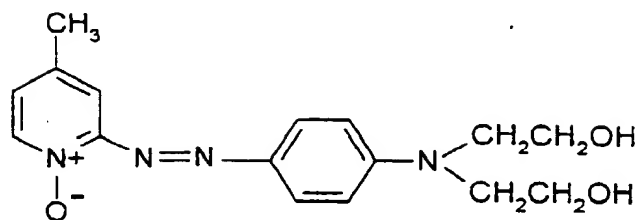
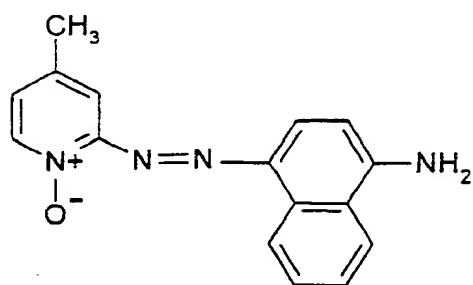
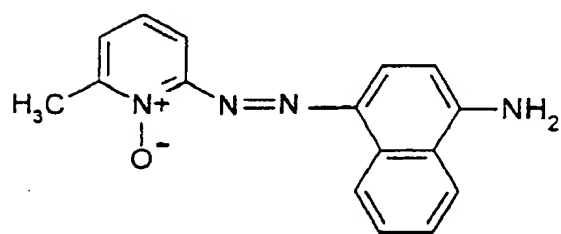
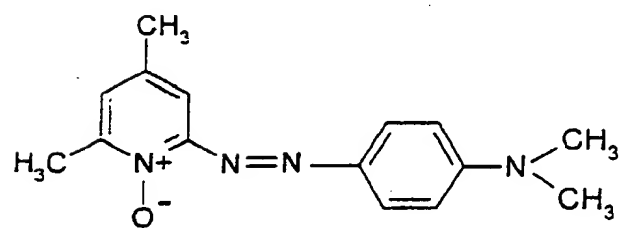
; and

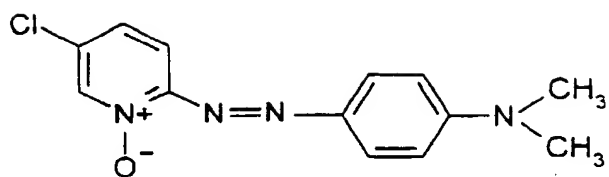
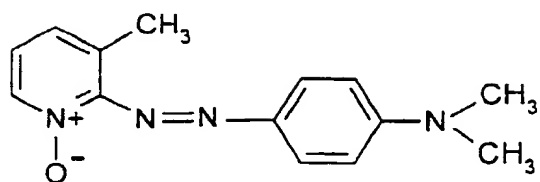
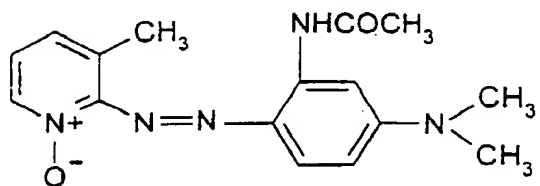
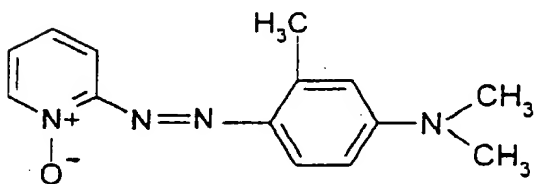
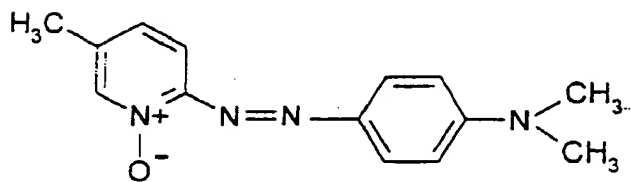
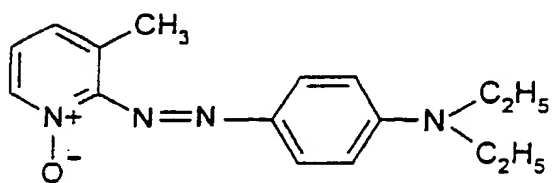


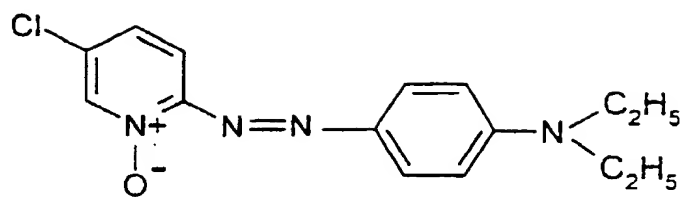
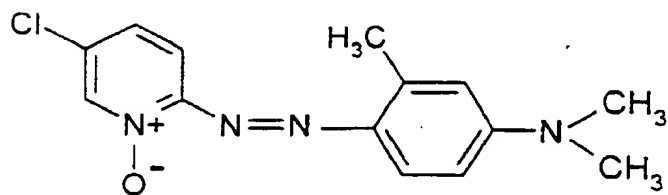
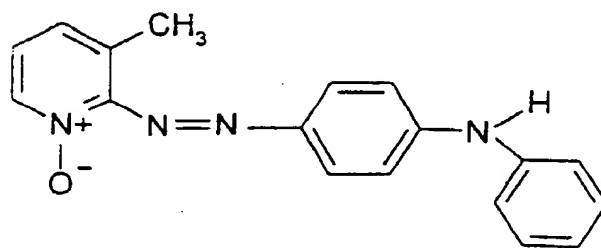
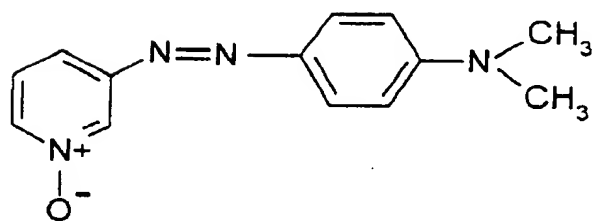
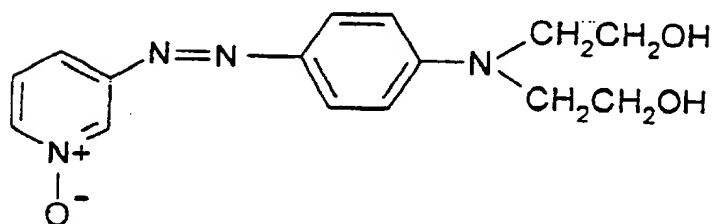
8. ~~Composition according to Claim 1,~~
~~characterized in that the cationic direct dyes of~~
 formula (IV) are chosen from the compounds
- 5 corresponding to the following structures (IV)₁ to
 (IV)₇₇:

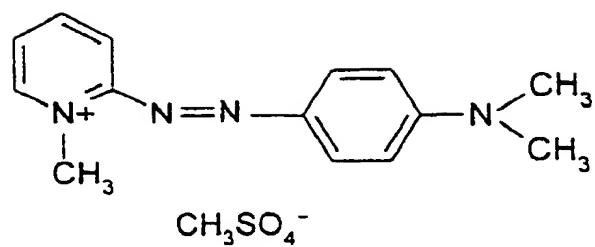
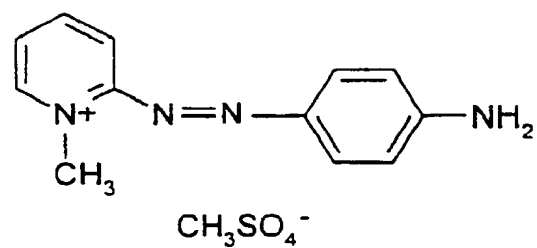
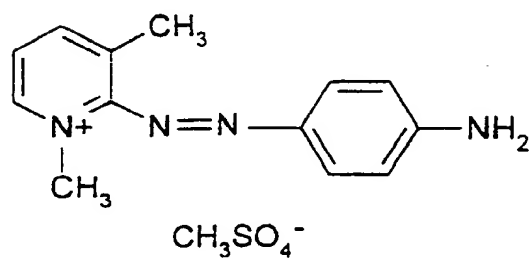
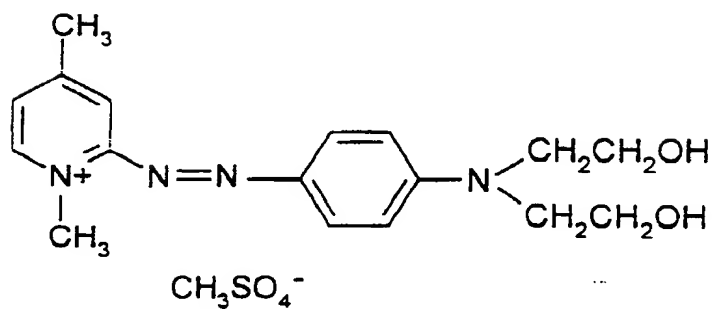
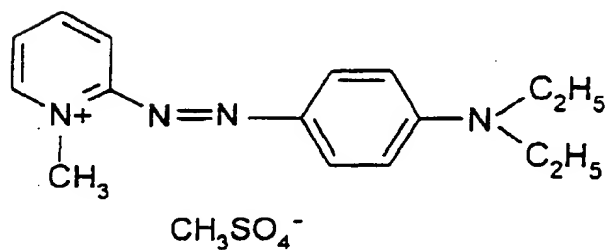
(IV)₁(IV)₂(IV)₃(IV)₄

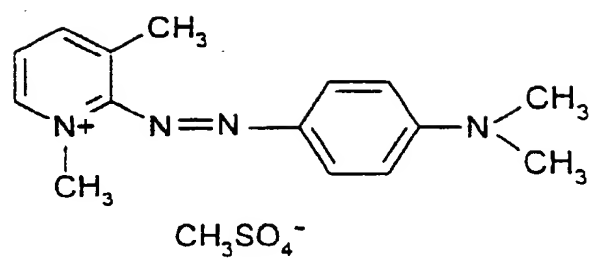
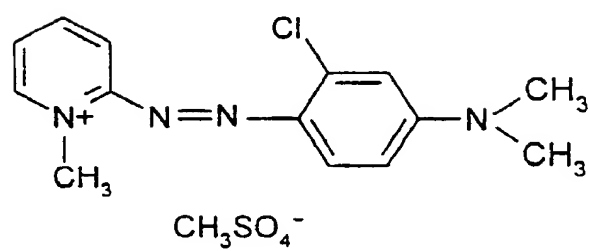
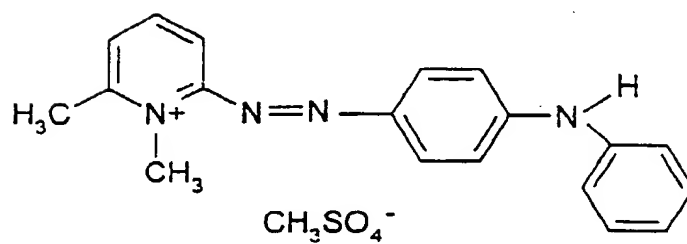
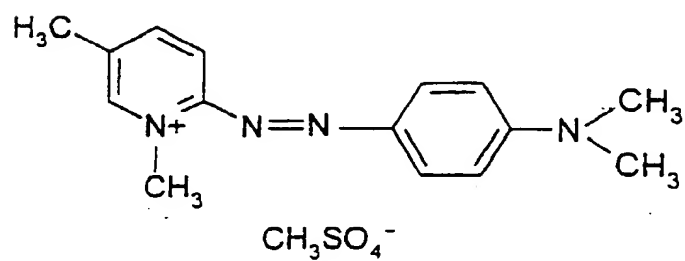
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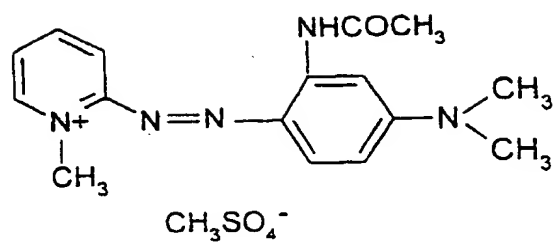
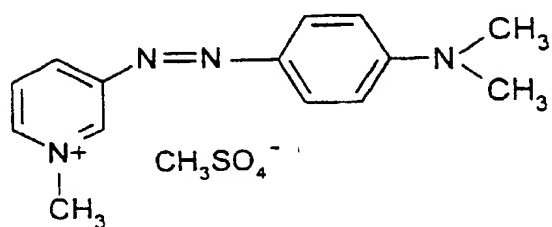
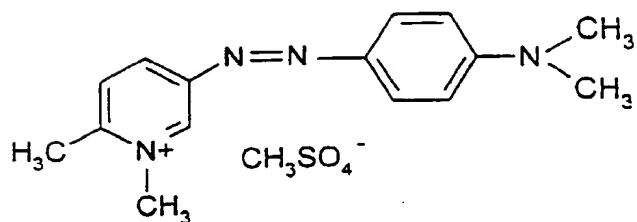
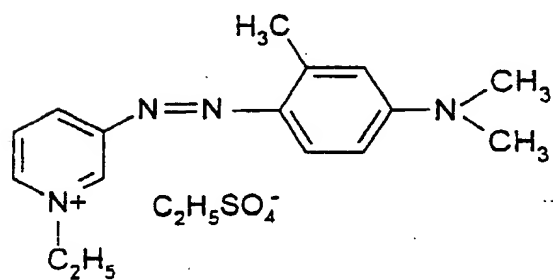
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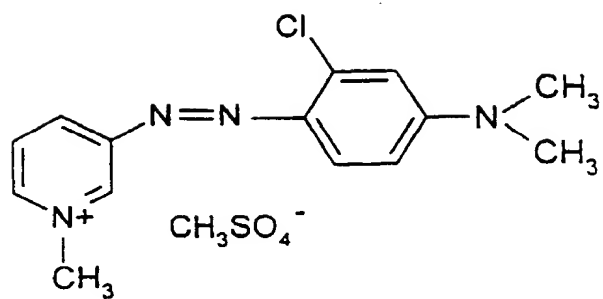
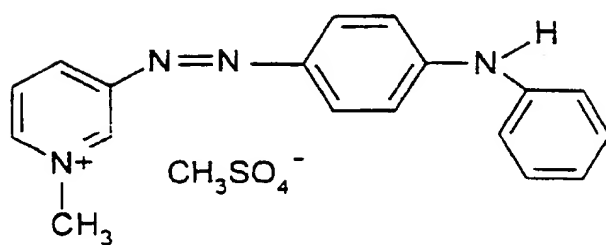
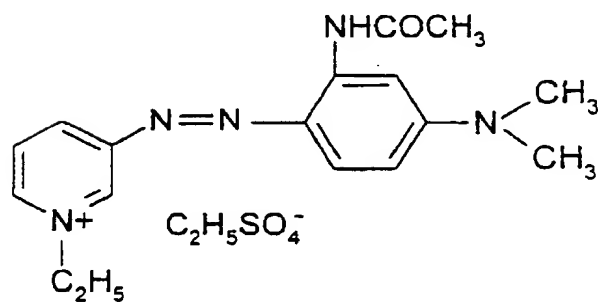
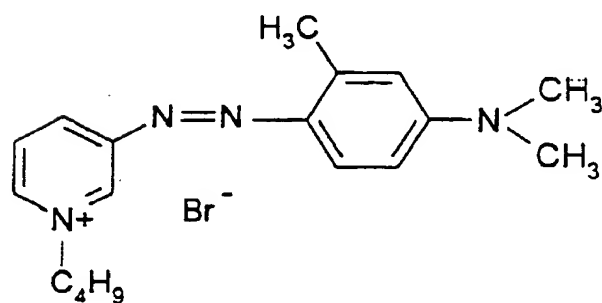
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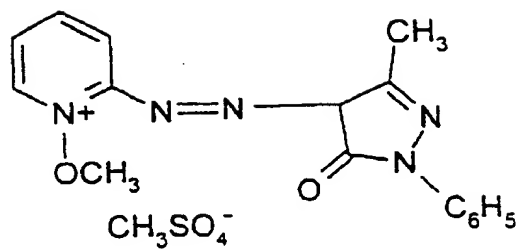
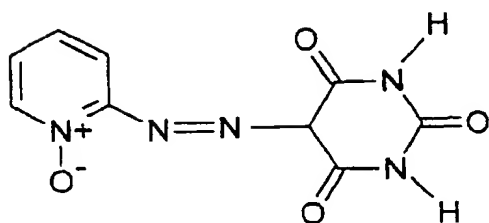
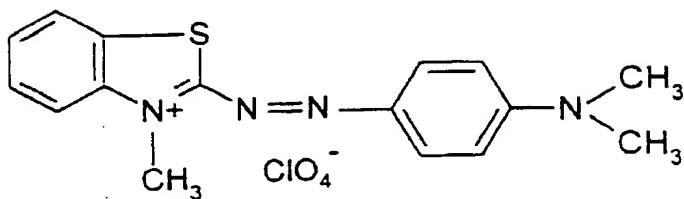
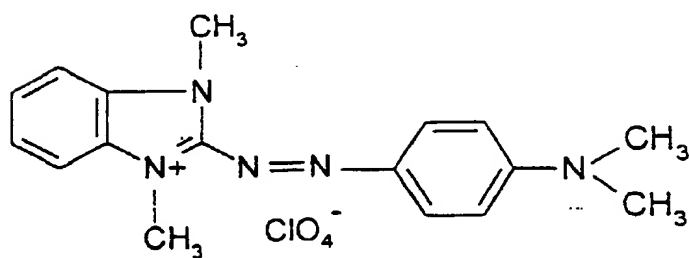
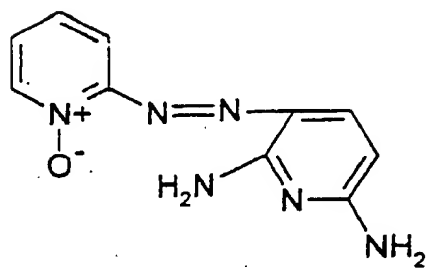
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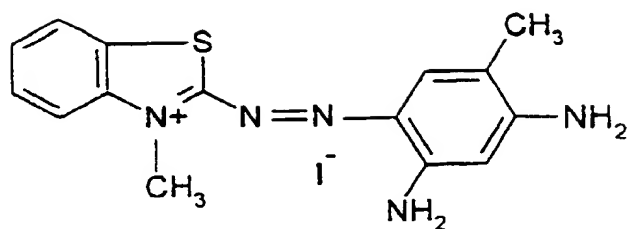
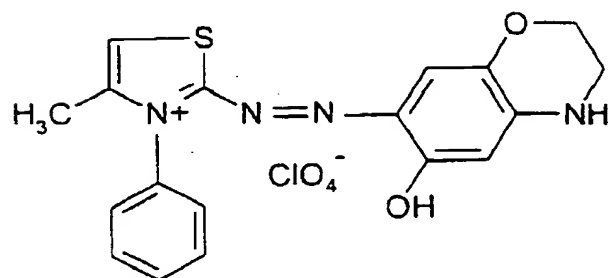
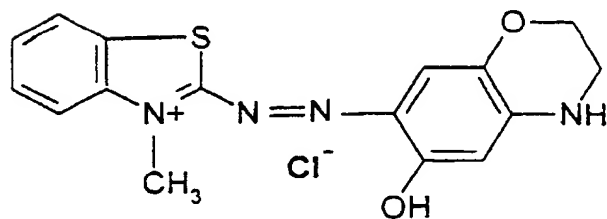
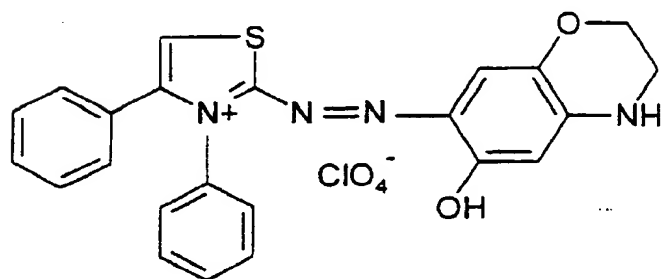
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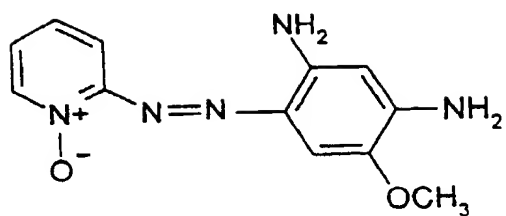
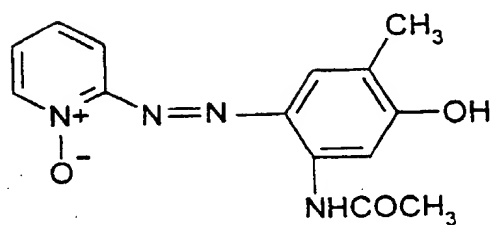
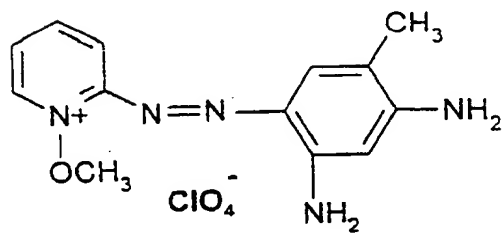
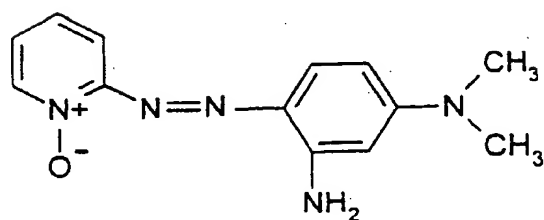
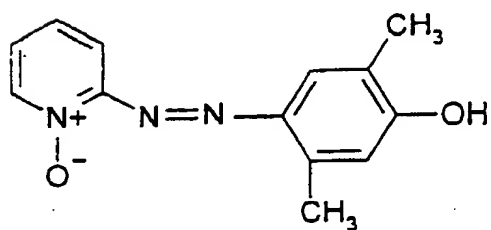
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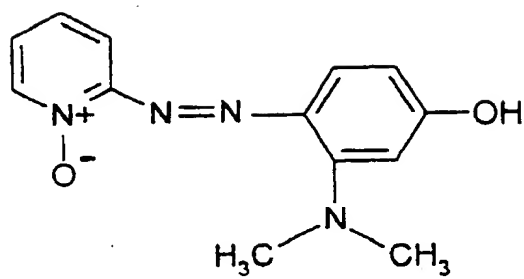
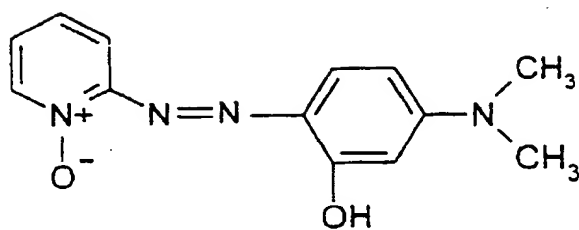
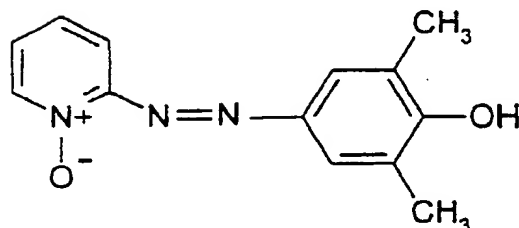
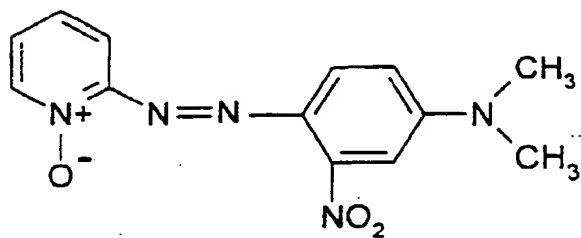
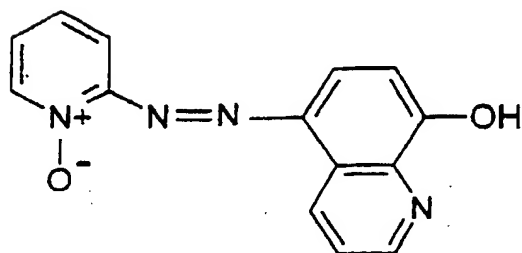
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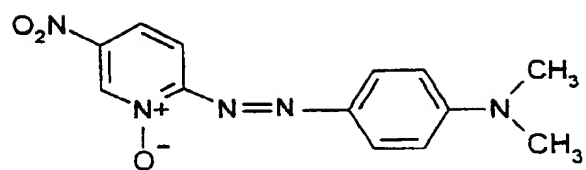
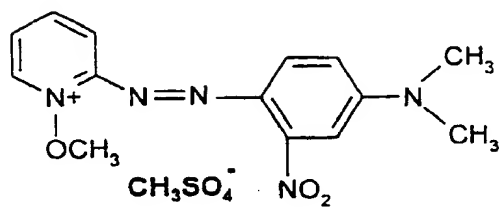
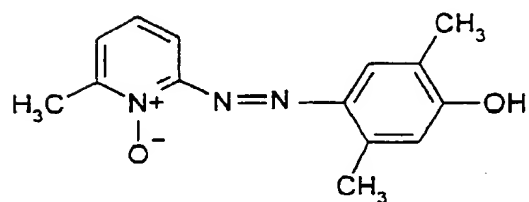
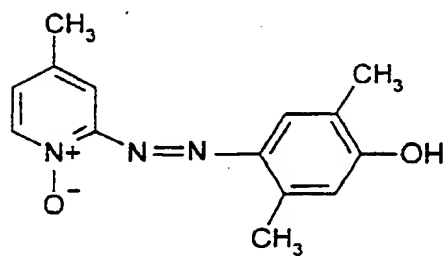
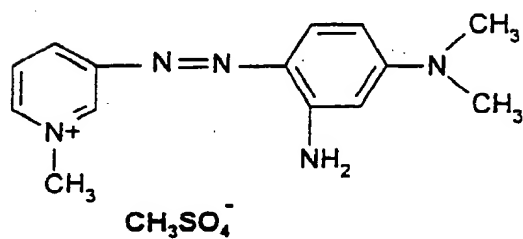
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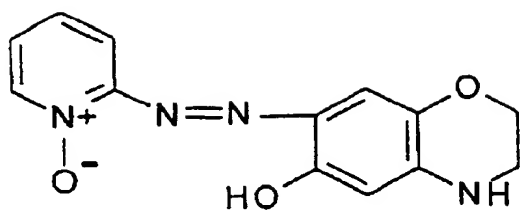
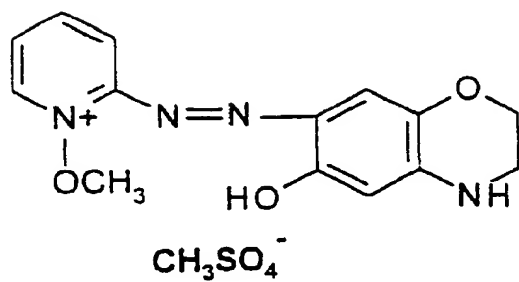
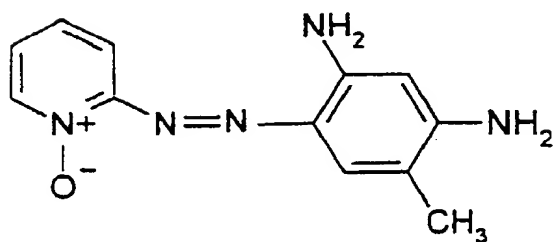
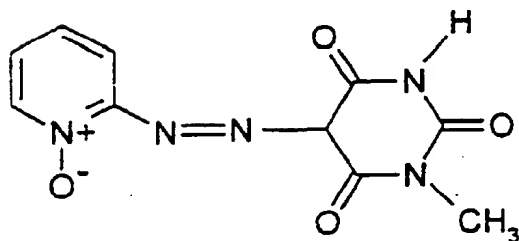
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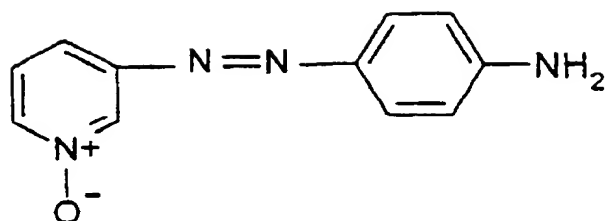
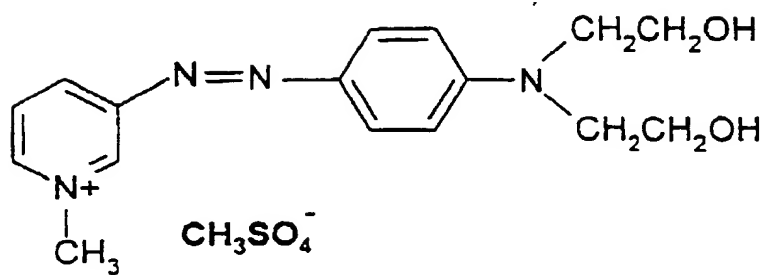
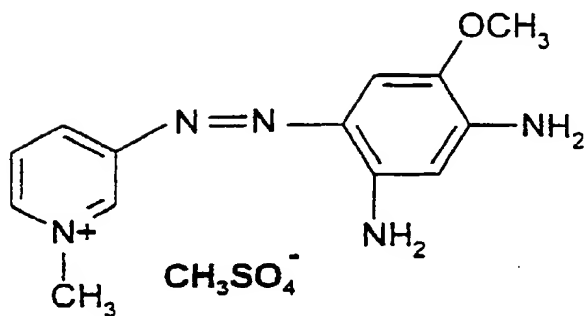
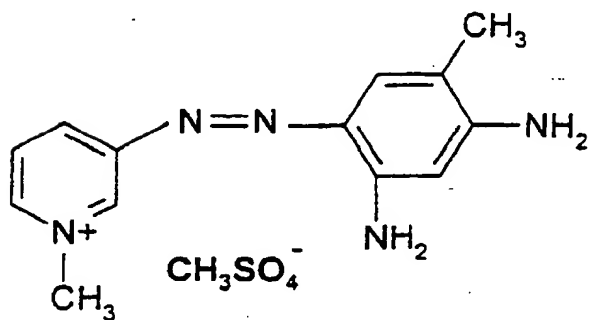
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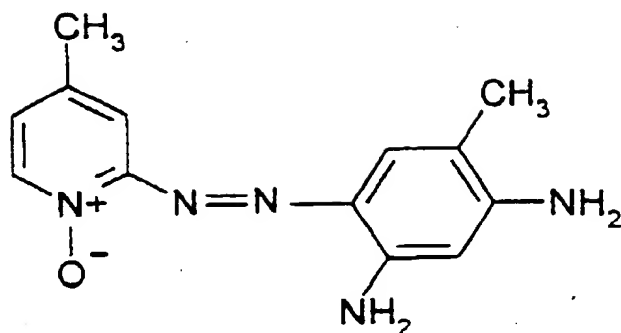
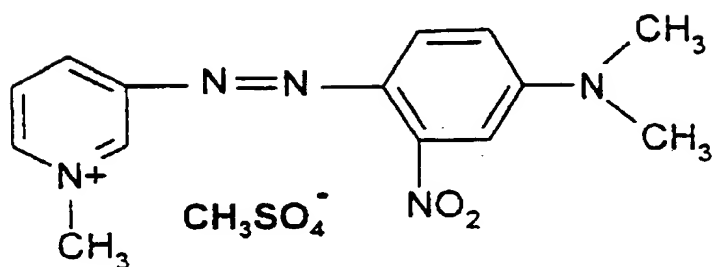
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(IV)₅₈(IV)₅₉(IV)₆₀(IV)₆₁(IV)₆₂

(IV)₆₃(IV)₆₄(IV)₆₅(IV)₆₆(IV)₆₇

(IV)₆₈(IV)₆₉(IV)₇₀(IV)₇₁

(IV)₇₂(IV)₇₃(IV)₇₄(IV)₇₅

(IV)₇₆(IV)₇₇

9. Composition according to any one of the preceding claims, characterized in that the cationic direct dye(s) of formulae (I), (II), (III), (III') or (IV) represent from 0.001 to 10% by weight of the total weight of the composition.

10. Composition according to Claim 9, characterized in that the cationic direct dye(s) of formulae (I), (II), (III), (III') or (IV) represent from 0.005 to 5% by weight of the total weight of the composition.

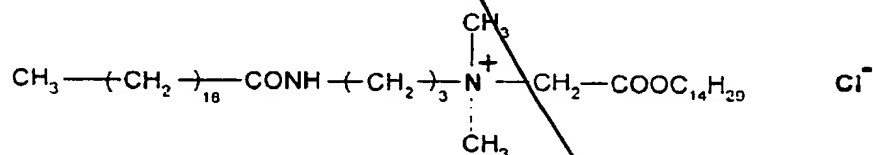
11. Composition according to any one of the preceding claims, characterized in that the quaternary ammonium salt (ii) of formula (V) is a dialkyldimethylammonium or alkyltrimethylammonium salt in which the alkyl radical comprises from 12 to 22 carbon atoms.

12. Composition according to Claim 11, characterized in that it is distearyldimethylammonium chloride, cetyltrimethylammonium chloride or behenyltrimethylammonium chloride.

5 13. Composition according to any one of the preceding claims, characterized in that the quaternary ammonium salt (ii) of formula (V) is a di(C₁-C₂ alkyl)(C₁₂-C₂₂ alkyl)hydroxy(C₁-C₂ alkyl)ammonium salt.

10 14. Composition according to Claim 13, characterized in that it is oleocetylhydroxyethylammonium chloride.

15 15. Composition according to any one of the preceding claims, characterized in that the quaternary ammonium salt (ii) of formula (V) is stearamidopropyltrimethyl (myristyl acetate) ammonium chloride of formula:



20 16. Composition according to any one of the preceding claims, characterized in that the quaternary ammonium salt(s) (ii) represent from 0.01 to 10% by weight of the total weight of the dyeing composition.

25 17. Composition according to Claim 16, characterized in that the quaternary ammonium salt(s) represent from 0.05 to 5% by weight of the total weight of the dyeing composition.

18. Composition according to any one of the preceding claims, characterized in that the appropriate dyeing medium (or carrier) consists of water or of a mixture of water and of at least one organic solvent.

5 19. Composition according to any one of the preceding claims, characterized in that it has a pH of between 2 and 11 and preferably between 5 and 10.

20. Composition according to any one of the preceding claims, characterized in that it is intended
10 for oxidation dyeing and in that it contains one or more oxidation bases chosen from the para-phenylenediamines, the bis-phenylalkylenediamines, the para-aminophenols, the ortho-aminophenols and the heterocyclic bases.

15 21. Composition according to Claim 20, characterized in that the oxidation base(s) represent 0.0005 to 12% by weight of the total weight of the dyeing composition.

22. Composition according to Claim 21,
20 characterized in that the oxidation base(s) represent 0.005 to 6% by weight of the total weight of the dyeing composition.

23. Composition according to any one of Claims 20 to 22, characterized in that it contains one
25 or more couplers chosen from the the meta-phenylenediamines, the meta-aminophenols, the meta-diphenols and the heterocyclic couplers.

24. Composition according to Claim 23, characterized in that the coupler(s) represent from 0.0001 to 10% by weight of the total weight of the dyeing composition.

5 25. Composition according to Claim 24, characterized in that the coupler(s) represent from 0.005 to 5% by weight of the total weight of the dyeing composition.

10 26. Composition according to any one of the preceding claims, characterized in that it is intended for direct lightening dyeing or oxidation dyeing and in that it then contains at least one oxidizing agent.

15 27. Method of dyeing keratinous fibres and in particular human keratinous fibres such as hair, characterized in that at least one dyeing composition as defined in any one of Claims 1 to 26 is applied to the fibres for a sufficient time to develop the desired colour, after which they are rinsed, optionally washed with shampoo, rinsed again and dried.

20 28. Method of dyeing keratinous fibres and in particular human keratinous fibres such as hair, characterized in that at least one dyeing composition as defined in any one of Claims 1 to 26 is applied to the fibres for a sufficient time to develop the desired
25 colour, with no final rinsing.

 29. Method of dyeing keratinous fibres and in particular human keratinous fibres such as hair, characterized in that it comprises a preliminary stage

consisting of storing in a separate form, on the one hand, a composition (A1) comprising, in an appropriate dyeing medium, at least one cationic direct dye (i) as defined in the preceding claims and at least one
5 oxidation base and, on the other hand, a composition (B1) containing, in an appropriate dyeing medium, at least one oxidizing agent, and then mixing them at the time of use before applying this mixture to the keratinous fibres, the composition (A1) or the
10 composition (B1) containing the quaternary ammonium salt (ii) as defined in the preceding claims.

30. Method of dyeing keratinous fibres and in particular human keratinous fibres such as hair, characterized in that it comprises a preliminary stage
15 consisting of storing in a separate form, on the one hand, a composition (A2) comprising, in an appropriate dyeing medium, at least one cationic direct dye (i) as defined in the preceding claims and, on the other hand, a composition (B2) containing, in an appropriate dyeing
20 medium, at least one oxidizing agent, and then mixing them at the time of use before applying this mixture to the keratinous fibres, the composition (A2) or the composition (B2) containing the quaternary ammonium salt (ii) as defined in the preceding claims.

25 31. Multicompartment device or multicompartment dyeing "kit", characterized in that a first compartment contains composition (A1) or (A2) as defined in Claim 29 or 30 and a second compartment

contains composition (B1) or (B2) as defined in Claim
29 or 30.

add

There are two main types of error in the analysis of variance:

- (i) *Systematic errors* - These are errors which are due to some systematic cause, such as a bias in the measurement or a change in the experimental conditions.
- (ii) *Random errors* - These are errors which are due to random causes, such as fluctuations in the environment or human error.